1988 Annual Report

Louisiana Department of Wildlife & Fisheries

A Message from the Secretary

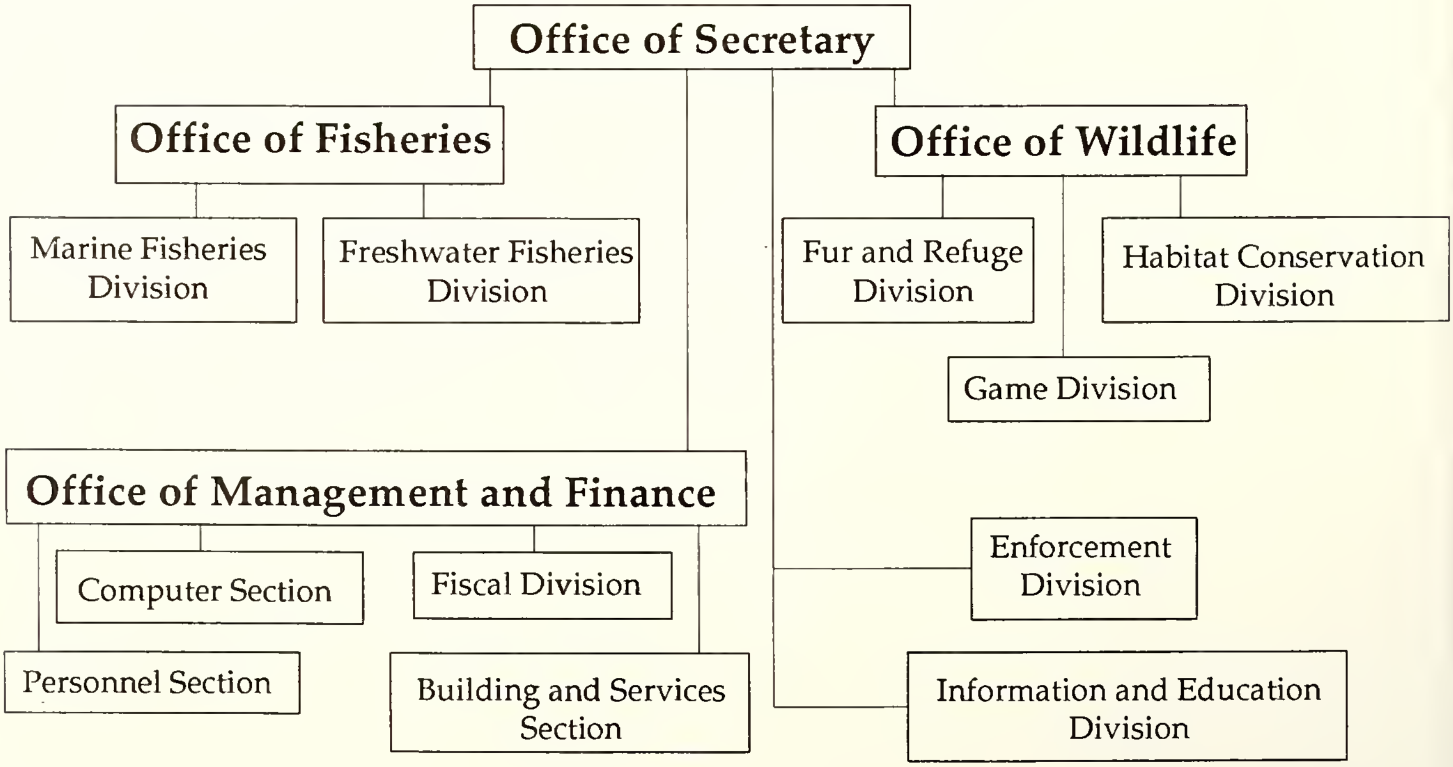
The Department of Wildlife and Fisheries herewith submits its 1988 Annual Report to the Governor and the Legislature of the State of Louisiana.

The report covers the many activities conducted by the department in the last calendar year to enhance, protect, perpetuate and properly harvest our renewable resources.

The importance of these resources to our quality of life and economic well being is incalculable. As chief public advocate and steward, this department serves to ensure that these resources are available for the use and enjoyment of present and future generations.

Virginia Van Sickle
Secretary

Administrative Structure Chart


Office of Secretary
Office of Fisheries
Marine Fisheries Division
Freshwater Fisheries Division
Office of Wildlife
Fur and Refuge Division
Habitat Conservation Division
Game Division
Office of Management and Finance
Computer Section
Fiscal Division
Personnel Section
Building and Services Section
Enforcement Division
Information and Education Division

Buddy Roemer, Governor
Virginia Van Sickle, Secretary
A. Kell McInnis III, Deputy Secretary
Bettsie Baker, Undersecretary
Jerry Clark, Assistant Secretary
Robert Misso, Assistant Secretary

Wildlife and Fisheries Commissioners
Don Hines, Bunkie, Chairman
Jimmy Jenkins, Baton Rouge
Bert Jones, Ruston
Norman F. McCall, Cameron
Joe Palmisano Jr., Chauvin
Warren I. Pol, Baton Rouge
Dale Vinet, Delcambre

Division Administrators
Hugh Bateman, Game
Bob Dennie, Information/Education
Bennie Fontenot, Fish
Johnnie Tarver, Fur/Refuge
Winton Vidrine, Enforcement

Regulations of the U.S. Department of the Interior strictly prohibit unlawful discrimination in departmental federally assisted programs on the basis of race, color, national orgin, age or handicap. Any person who believes he or she has been discriminated against in any program, activity, or facility operated by a recipient of federal assistance should write to: Director, Office for Equal Opportunity, U.S. Department of the Interior, Washington, C.C. 20240.

This public document was published at a total cost of $2,350.00. 1,000 copies of this public document were published in this first printing at a cost of $2,350.00. The total cost of all printings of this document, including reprints, is $2,350.00. This document was published by the Louisiana Department of Wildlife and Fisheries, 2000 Quail Drive, Baton Rouge, LA 70808 to service the state agencies in keeping them cognizant of the new rules, regulations and activities under authority of R.S. 49:951-968. This material was printed in accordance with standares for printing by state agencies established pursuant to R.S. 43:31. Printing of this material was purchased in accordance with the

Front Cover: Red-Cockaded Woodpecker by Julia Sims

Contents

2 **Administrative Structure Chart**
4 **Office of the Secretary**
4 **Enforcement Division**
4 **Information and Education Division**
5 Information Section
5 Education Section
5 **Office of Management and Finance**
5 **Fiscal Division**
6 Personnel Section
6 Computer Center
6 Building and Services Section
7 **Office of Fisheries**
7 **Freshwater Fisheries Division**
7 Fisheries Section
10 Aquatic Plant Research and Control Section
11 **Marine Fisheries Division**
11 Shellfish Subprogram
12 Mollusc Subprogram
13 Research Subprogam
14 Finfish Subprogram
17 **Office of Wildlife**
17 **Habitat Conservation Division**
17 Ecological Studies Section
18 Louisiana Natural Heritage Program
19 Nongame Wildlife Program
19 **Game Division**
19 Land Acquisition
19 Forestry Section
20 Research Section
22 Development Section
22 District Activities
26 Upland Game Section
27 **Fur and Refuge Division**
27 Land Management
33 Maintenance Section
33 Research
33 Fur Research and Management
37 Resource Management
38 Fur and Alligator Advisory Council

Office of the Secretary

The secretary, as chief administrative officer of the Department of Wildlife and Fisheries, is responsible for all wildlife and fisheries resource management activities in Louisiana. She is also deeply involved in vital conservation matters on both national and international levels.

Administration of the Office of Management and Finance, the Enforcement Division and the Information and Education Division, is directly in the Office of the Secretary, while the administration of the other major divisions, Game, Fur and Refuge, Habitat Conservation, Freshwater Fisheries and Marine Fisheries, is delegated to assistant secretaries.

The secretary is assisted in the administration of the department by a deputy secretary, who is chiefly involved with the management of the Enforcement Division.

Also within the structure of the Office of Secretary, the undersecretary administers the Office of Management and Finance which includes the Fiscal Division and the Personnel, Building and Services and Computer Sections.

Enforcement Division

The Enforcement Division is responsible for enforcing laws enacted by the Louisiana Legislature relative to fish and wildlife resources, boating safety regulations and federal regulations pertaining to migratory birds and endangered species.

Meeting this responsibility during the past year was very difficult. Due to the state's financial condition, the loss of some Enforcement agents was unavoidable, but every effort is being made to maintain the level of service the public needs and expects.

A major part of this effort will be better training, which is the only way to continue effective enforcement with fewer agents. The position of Division Training Officer will be filled in the near future and positive goals have already been set. The plans call for all agents to be recertified in C.P.R., the institution of a continuing physical fitness program and intensified firearms training.

In 1988, agents of the Enforcement Division issued approximately 20,000 citations to violators of fish, game, and boating laws. These citations were the result of thousands of inspections by agents to insure compliance with the laws and regulations that safeguard and conserve our wildlife resources.

Migratory waterfowl enforcement was stepped up in the 1988-89 hunting season in response to continued dwindling duck populations. Enforcement Agents attended in-service training classes on federal regulations prior to the hunting season and teamed up with Federal Agents to work waterfowl.

The effort resulted in an increase in bag checks and effective enforcement of the bag limits and related regulations. The Division will continue to work closely with the U.S. Fish & Wildlife Service to insure protection of waterfowl.

In the area of saltwater enforcement, the Division put forth a two-pronged attack on two continuing problems. The Saltwater Enforcement Patrol (S.W.E.P) units consisting of the Delta Tide and Rip Tide, worked extensively on gill net violations. Thousands of feet of net were seized in all coastal areas. The other half of the increased effort went toward the illegal oyster harvest. Many hours of flight time were logged by Enforcement Division pilots and aircraft as they patrolled polluted oyster beds. Waterborne agents cited violators who were caught harvesting from polluted beds or stealing from leased beds. Seized oysters were dumped back on the beds and many sacks of polluted oysters were prevented from reaching the consumer.

Louisiana's Operation Game Thief, the grass roots anti-poaching campaign, continued to pay cash rewards for information which led to the arrest of game and fish violators. O.G.T. paid an impressive $10,000 in cash in 1988 and has paid in excess of $43,000 since its birth in July of 1984.

The Covert Operations Sections had a successful year and was beefed up with the transfer of several veteran agents. This action was taken due to an increase in the commercial selling of protected game animals and fish.

The Boating Safety Section remained active and operated two special teams of agents trained in D.W.I. detection and apprehension. Coast Guard statistics reflect that alcohol is involved in 60% of all boating accidents and even with the operation of the special teams, 63 people died in boating accidents in 1988. Many more sustained non-fatal injuries and property damage amounted to many hundreds of thousands of dollars.

The Division will continue to train agents in D.W.I. detection and attempt to strengthen the implied consent law, as it pertains to boat operators, in order to reduce the number of boat accidents.

The Enforcement Division will also continue to work and assist other law agencies in search and rescue operations after natural disasters or other emergencies.

Information and Education Division

The Information and Education Division underwent a complete reorganization during calendar year 1988. While staffing and budget declined, division programs increased.

Additionally, the division was able to shift a major portion of its funding to sources other than Conservation Fund monies, thus freeing up much-needed dollars for other divisions within the department.

Information Section

The activities of the Information Section are subdivided into four program areas. Two were incorporated into the division's program during 1988, but did not actually get underway until 1989.

News

The information section produces approximately 150 news releases annually. Prior to 1988, these were mailed to 1,400 plus different individuals throughout the United States. Specific guidelines were developed in 1988 as to who was eligible to receive department news releases. As a result, the mailing list has been cut approximately in half, thus resulting in a significant savings to the department.

La. Conservationist Magazine

On January 1, 1989, the Louisiana Conservationist Magazine became a self-funded, paid circulation magazine funded under an ancillary budget attached to the Department of Wildlife and Fisheries.

From early September 1988, when subscriptions began arriving in the department, until mid-December, the cutoff date for the January/February 1989 issue, over 40,000 Louisianans subscribed to the magazine. By April of 1989, that figure had increased to over 50,000.

La. Conservationist TV Magazine

Late 1988 also saw the formation of subprogram for development of a 30-minute weekly magazine format outdoor and environmental television show aptly named the Louisiana Conservationist TV Magazine. The show is currently scheduled to go on the air in late summer of 1989.

The show is shot entirely in the field and consists of two long feature segments plus several short segments all tied together by a host. It is designed so that the individual segments can be used by teachers in the classroom.

Responsive Management

Responsive Management is a PC-based survey instrument that is designed to give governmental agencies a practical, valid and timely means to gather and analyze socio-economic data that are useful in making decision and anticipating future problems.

The current schedule calls for the program to go on-line nationwide in the summer of 1990. Louisiana, however, was chosen to pilot the project in late 1989.

Education Section

Currently, the Education Section's activities are subdivided into four subprograms. Three of the programs are 100 percent federally funded and account for over 90 percent of the section's total expenditures.

Hunter Education

Anyone born on or after September 1, 1969 is required by law to successfully complete a certified Hunter Education course before they can be issued a hunting license. In addition, Louisianans of all ages who plan to hunt in other states are also usually required to complete the course.

Taught in the course, in addition to firearm safety, are wildlife identification, principles of wildlife management and outdoor ethics. During the calendar year 1988, approximately 18,000 Louisianians successfully completed the Hunter Education Course.

Aquatic Education

Aquatic Education looks at aquatic habitats, animals and safety in much the same way as Hunter Education does its terrestrial counterparts. Funded under another federal program that draws its monies from the recreational fishing industry, Louisiana's aquatic education project agreement was approved by the federal government in late 1988, but the program itself will not get into full swing until the beginning of the 1989-90 fiscal year.

Boating Education

Boating safety education has been a part of the Education Section's activities for many years, but was not given full subprogram status until the section reorganization in late 1989 with the appointment of a full-time Boating Safety Education Coordinator.

Project WILD

Project WILD is an award-winning environmental and conservation education program of instructional workshops and supplementary curriculum materials for teachers of kindergarten through high school age youth which prepares students to be responsible decision makers.

Currently, Project WILD is active in 47 states. Louisiana joined the program in late 1988.

Office of Management and Finance

The Office of Management and Finance oversees the financial operations of the Department and acts to provide general administrative services to all operating units within Wildlife and Fisheries. The Undersecretary has primary responsibility for coordinating and controlling the Office of Management and Finance, which encompasses oversight of the Fiscal Division, Personnel Section, Building and Services section and the Computer Section.

Fiscal Division

The Fiscal Division handles all of the financial matters for the Department. The Fiscal Division has the primary responsibility to see that all financial activities and procedures are handled in compliance with standard accounting practices as well as in compliance with Legislative Audit requirements. This division is composed of the following sections: General Accounting, Accounts Payable, Audit, Payroll, Purchasing, Property Control, Revenue Operations, Licensing (Sports and Commercial) and Motorboat registration.

Activities that are administered in this group include: coordination and preparation of the annual budget, routine management reporting (actual activity versus budget), preparation of annual financial statements and required fiscal reports, federal aid reporting and special quarterly financial statement preparation. In addition, this section maintains records on the department's liability insurance, telecommunications equipment inventory and service.

Revenues collected for fiscal year 1987-88 are as follows:

Conservation Fund:	
Royalties	$ 4,740,348
Rentals on Land	649,826
Other Income on Land	103 ,581
Interest Income	33,914
Severance Taxes	2,330,154
License Sales	12,251,428
Miscellaneous	3,221,461
Rockefeller Refuge Fund:	
Royalties	3,275,154
Rentals on Land	745
Other Income on Land	1,112,865
Interest Income	18,286
Miscellaneous	95,168
Marsh Island Refuge Fund:	
Royalties	154,872
Interest Income	344,316
Rentals on Land	
Other Income on Land	25,690
Miscellaneous	107,449
State Wildlife Refuge and Game Preserve Fund:	
Rentals on Land	5,970
Louisiana Help our Wildlife:	
Private Donations	23,869
Interest Income	2,085
Wildlife Tax Fund:	
Private Sources	23,489
Seafood Promotion and Marketing Fund:	486,589
Interagency Transfers	37,899
LOOP	289,503
Federal	5, 125,060
Total Revenue	$34,473,295

Personnel Section

Since the new 32-level pay plan was implemented effective June 29, 1987, numerous appeals to establish equity between classifications has continued.

In September, in anticipation of a layoff, the Personnel Section began researching and verifying the state service time of all employees.

Upon receipt of positions targeted for abolishment, determined by administration, the personnel staff traveled throughout the state visiting with the affected employees to discuss procedures of the impending layoff.

Based on verified adjusted service dates, which were viewed and approved by each employee, "bumping" procedures were initiated manually, using the above verified service dates, career fields, and commuting areas. At this time, personnel staff again made personal contact with employees in relation to offers or layoff.

The layoff plan, approved December 21, 1988, was initiated and completed following specific guidelines and deadlines set forth by the Department of Civil Service and the Division of Administration.

In November, open enrollment for health maintenance organizations was offered to departmental employees and retirees. Assistance was given in completion of forms and providing information.

Assistance with personnel-related matters is provided to a wide range of individuals, including job applicants, active employees, retirees, former employees and surviving spouses.

Computer Center

During the year, the Computer Center continued its efforts to assist by making available additional information for all offices within the department through computerized means via telecommunications.

Additional personal computers were placed in offices throughout the state, enabling the department to perform needed functions using in-house developed software packages as well as vendor software packages. In doing so, a more effective means of reaching the department's goals was accomplished.

Building and Services Section

The Building and Services Section serves the important function of building maintenance for Wildlife and Fisheries offices in Baton Rouge and New Orleans and outlying areas and also stocks office supplies for the entire department.

In addition, it also provides services to departmental personnel including, but not limited to, handling the department interoffice, incoming and outgoing mail; distribution of office supplies statewide; volume copying of books and publication; and printing.

Office of Fisheries

The Office of Fisheries, supervised by one of two assistant secretaries reporting directly to the Department Secretary, oversees the state's freshwater and saltwater fisheries resources. The office comprises two divisions, Freshwater Fisheries and Marine Fisheries.

Freshwater Fisheries Division

Louisiana's vast fishery resources are vital to the state's economy from the standpoints of both recreation and commerce. The Freshwater Fisheries Division is responsible for managing, protecting, conserving and replenishing those resources, and for controlling undesirable aquatic vegetation that hampers fisheries management, navigation, and fisherman access in Louisiana waterways.

Certain programs of the division that deal with sportfish restoration (research, survey, development and technical assistance) are funded wholly or in part through the Dingell-Johnson federal aid program. The 1984 Wallop-Breaux amendment to this program secured additional revenue which is in addition to the on-going Dingell-Johnson funds and have greatly increased the fish restoration programs in the state. These funds have been used for the construction of fisherman access areas (boat ramps, fishing piers, bank access, habitat improvement, etc.), enlargement and improvement of the division hatchery system, and increased staffing to meet the demands of sport and commercial fishing on limited freshwater fisheries resources.

Fisheries Section

The objective of the Fisheries Section is to manage fish populations and habitats for the conservation and improvement of sport and commercial fishing, located primarily in freshwater areas of the state. The Fisheries Section manages five basic sub-programs, including Hatcheries, Research and Survey, Maintenance and Development, Coordination, Other Services.

Hatcheries

Striped Bass Program

The striped bass program in Louisiana is designed for the biological control of shad populations in the state's reservoirs and oxbow lakes while providing a highly desirable sportfish. Excellent populations of striped bass/hybrid striped bass presently occur in many waterbodies throughout the state. During 1988, 1,053,898 striped bass were stocked in Toledo Bend Reservoir, while 11 other lakes throughout the state were stocked with 194,838 hybrid striped bass. An additional 270,020 striped bass fingerlings were stocked in coastal streams.

Flathead Catfish Production

A flathead catfish spawning and reproduction project was initiated several years ago to provide a top predator in public lakes and farm ponds with excessive forage populations of gizzard shad and/or stunted bluegill. This large catfish also provides an excellent addition to the fisherman's creel. Production and culture of these voracious predators is difficult, although techniques and methodologies to raise them are being improved annually. Fish Section biologists are confident that culture techniques will improve to the point where numerous lakes and ponds will be stocked in the future. In 1988, 5,610 flathead catfish fingerlings were produced.

Fish Hatchery Program

There are three state owned fish hatcheries located at Monroe, Forest Hill, and LaCombe comprising 38 acres of production ponds. These hatcheries produced 428,024 Florida largemouth bass, 1,161,934 bluegill, 82,438 striped bass, 31,200 hybrid striped bass and 115,000 coppernose bream. All fish produced were stocked in the fingerling stage. The Federal Hatchery in Natchitoches, in cooperation with the Fish Section, produced 507,824 Florida bass, 1,241,480 striped bass, 164,638 hybrid striped bass, 248,720 channel catfish, 135,689 blue catfish, 275,214 redear sunfish and 1,702,415 bluegill. Mississippi also provided 155,000 Florida bass.

Florida Largemouth Bass Program

Six lakes (Caney Lake, Black Lake, Saline Lake, Chicot Lake, Sibley Lake and Audubon Park) were stocked with a total of 619,699 Florida largemouth bass fingerlings in 1988. The purpose of this program is to establish trophy size Florida bass fishing in Louisiana. One of the above lakes, Caney, is also being studied intensively for adaptability and catchability of Florida bass. It is anticipated that in the future, the Fish Section will utilize Florida bass stockings in selected lakes in conjunction with lake intensive management programs.

Farm Pond Extension Program

Fisheries biologists provide advice and technical assistance to farm pond owners throughout the state. In 1988, advice involving aquatic weed problems, turbidity, fertilization, parasites and diseases and fish population balance was offered to owners of 1,694 ponds totalling 12,729 acres. The Fish Section provided farm ponds with 471,149 Florida bass, 2,864,149 bluegill, 275,214 redear sunfish and 115,000 coppernose bream in 1988. However, as of July 1, 1989 private ponds will no longer be stocked in this program, and all fish production will be targeted for public waterbodies.

Fish Parasite and Disease Studies

The Freshwater Fisheries Division has contracts with Auburn University and the Louisiana State University Veterinary School to conduct both research and to provide diagnostic services and training programs for Fish Division biologists. Auburn's services include research on such topics as catch-and-release mortality of largemouth bass and striped bass diseases. The LSU Veterinary School project, as is the Auburn University project, is a federally-funded project which provides invaluable services to the Freshwater Fisheries Division hatcheries which have disease problems, to pond owners, and to sportfishermen who find diseased fish in public waters. The LSU project also aids in training Division biologists in the identification of parasites and pathogens, and the administration of treatments for fish populations in their respective districts.

Research and Survey

Lake and River Intensive Surveys

An extensive project design was initiated in late 1988 for intensive surveys of 11 Louisiana lakes and rivers. These surveys will involve creel, electrofishing, rotenone sampling, netting and seining using standardized methods; data will be utilized for management recommendations which may ultimately call for certain harvest restrictions in some of these waterbodies. Manpower for these surveys will be pooled between the Fish and Aquatic Plant Sections in this federal aid project.

Joint Louisiana/Texas Toledo Bend Reservoir Survey

September 1, 1988, both Louisiana and Texas agreed to standardize bass and crappie harvest regulations at Toledo Bend Reservoir, with enactment of a 12 inch minimum length and 10 daily bag limit for black bass, and a daily bag limit of 50 crappie. In addition, both states agreed to survey both angler success and harvest and fish populations through creel surveys, electrofishing, netting and rotenone sampling. Results of this joint survey will be analyzed by both states, and will provide baseline data which will prove invaluable in future fisheries management plans at this reservoir.

Fish Population Surveys

1988 under this program 23 lakes were sampled with rotenone to determine fish species composition and pounds of fish per acre. From these data, management plans and recommendations for harvest regulations were formulated. Recommendations for lake drawdowns comprised 9,000 acres, increasing potential fishing efforts an estimated 36,000 man-days.

Survey of Factors Affecting Fish Production in the Larto-Saline Area

The primary objective of this project is to define factors affecting fish production in the Larto-Saline area, including water quality, fish population, pesticide levels, and benthos data. This survey will add to the data base of the area and will be valuable in the formulation of management plans to restore better water quality, fish production and recreational value to this important fishery.

Statewide Evaluation of Wire Traps on Gamefish

Some commercial fishermen are striving to have wire traps legalized for capture of commercial fish. Data have been analyzed from experimental wire trap sets and final recommendations support the use of several variations of wire traps. The traps were found to be highly selective, collecting large numbers of catfish without catching appreciable quantities of game fish.

Channel Catfish Investigations in Southeast Louisiana

Waterbodies in southeastern Louisiana appear to support large numbers of small , possibly stunted, adult channel catfish. This project was begun in 1985 to examine the population structure, size at sexual maturity, age and growth and feeding habits of channel catfish in Lakes Des Allemands and Maurepas. The final report will be used to help formulate management plans for channel catfish including setting commercial and recreational size limits. The project is due for completion in 1989.

Channel Catfish Investigations, Southern Louisiana

In 1988 a study was initiated in Lake Verret, Lake Palourde, and Lake Fausse Point. The goals of this study are to determine the standing crop of all species present, age, growth, movement and length at sexual maturity of channel catfish and commercial fishing gear selectivity. This information will lead to a better understanding of the fish populations in these systems and enable the Department to make sound management recommendations. This project is scheduled to be completed in 1991.

L.S.U. Cooperative Fishery Research Unit

Problems arise in fishery management which can often be resolved with a short-term project using limited personnel. The Cooperative Research Unit is partially funded by the Louisiana Department of Wildlife and Fisheries on the premise that specific research needs can be filled by the use of graduate students working under the guidance of a member of the L.S.U. staff. The findings of this unit have proven of great value to many of our management programs. The Unit is presently monitoring largemouth bass populations in conjunction with the Fish Section through age and growth analysis and electrophoretic studies. Both age and growth and identification of genetic stocks will provide critical input into the Fish Sections' intensive survey project. In addition, the Unit has provided research and consulting on coppernose bream, marsh bass and channel catfish, all of which have provided invaluable information to the Department. The Coop Unit contract was expanded in 1988 through use of Dingell-Johnson federal aid monies at no additional cost to the Department.

Chicot Lake Investigations

A comprehensive study of largemouth bass started in Chicot Lake in 1988. The goal of this project is to produce more bass in the 3 - 5 pound range and possibly to produce greater numbers of "trophy" size bass. A 10 fish creel 14" minimum size limit was imposed on the lake and at the same time intensive studies of the fish populations began. Over 1, 000 advanced fingerling and 350,000 2 - 3" fingerling Florida largemouth bass were stocked in Chicot Lake. Age, growth, mortality, population structure and genetic background of largemouth bass will be closely monitored, as well as the total standing crop for all species. Fishermen catch statistics will also be monitored. From this research, the Fish Section should be able to tailor a bass management program best suited to Chicot Lake.

Grass Carp (White Amur) Monitoring Program

The Department initiated a study of triploid grass carp in a private lake in Central Louisiana. Unlike the diploid or normal grass carp, the triploid grass carp is functionally sterile. This feature may allow fishery biologists to stock grass carp into waterbodies with aquatic weed problems without the fear of introducing an exotic fish capable of upsetting the delicate balance of our inland and coastal habitat.

Ten to twelve inch fingerlings averaging one-third pound were stocked into the lake in December 1985. Biologists will sample the fish population, water quality and aquatic vegetation for five years to determine the effect of the grass carp on the lake. Several grass carp will be collected each year to determine their growth rate and sexual condition. Grass carp collected three years after stocking averaged 14 1/2 pounds.

Fish Kill Investigations

Fisheries biologists investigate natural fish kills that occur in water- bodies to determine the cause of the kill. Reports of the findings are furnished to individuals, groups, public agencies, and news media upon request. Corrective measurements needed to alleviate the kill situation are recommended, although not always possible or feasible to implement. Fish Section biologists also work in conjunction with Environmental Resource Specialists of the Department of Natural Resources when investigating fish kills thought to be caused by industrial pollution. The main function of the fisheries biologist when investigating this type kill is to assess the species and quantity of fishes killed and their monetary values. There were approximately 100 fish kill investigations made in 1988 including both major and minor kills.

Scuba Fishing For Gamefish

Toledo Bend Reservoir is currently the only Louisiana freshwater lake where gamefish may be taken by scuba divers. For the third consecutive year, this season, running from June 1 through September 30, was opened experimentally on the Louisiana portion of the reservoir below the Pendleton Bridge. This season is being monitored by three approaches: 1) Monthly reports submitted by scuba divers to the Department as a condition of receiving an annual scuba fishing permit, 2) Roving creel censuses for purposes of personal interviews with scuba fishermen, and 3) Scuba spearfishing efforts done one week per month in each season by two Department divers for purposes of comparing harvests with catch reported by permitted divers. The Fish Section will provide recommendations to the Commission in 1989 for any changes in this special season if data so indicate.

Survey of Paddlefish Stocks in Louisiana

Paddlefish (spoonbill catfish) in Louisiana have come under increasing harvest pressure in recent years, primarily because paddlefish eggs have become an acceptable alternate caviar source for Iranian sturgeon caviar. The paddlefish also provides a valuable sport snagging fishery in large river lock and dam structures. This project was undertaken to provide the Department with baseline biological data on this previously unstudied fish. Obtaining such data as growth rates, age at maturity, net susceptibility, and relative abundance should enable the Department to better manage its paddlefish stocks. A comprehensive management plan for this species will be presented in 1989.

Aquatic Vegetation Investigation for Sportfish Management

This research project involves the study, management, and control of noxious aquatic vegetation in lakes for the overall enhancement of fisheries. The project also involves the updating and preparation of new contour maps and lake guides for sportsmen and management biologists.

Caney Lake Investigations

Caney Lake, a recently completed and inundated 5,000 acre lake near Chatham, Louisiana, offers the Department a unique opportunity to study the biology of the Florida largemouth bass. Over 800,000 Florida bass were stocked in this impoundment in the past three years. The presence of some native largemouth bass offers an opportunity to study the adaptability and catchability of Florida bass vs. native bass. Study approaches include creel survey work, rotenone sets, age and growth, food habits, reproductive development and identification through meristic counts and electrophoresis.

Maintenance and Development

Public Access and Boating Facilities

This project is designed to construct, acquire, develop, renovate and/or maintain additional or improved access of public waters for boating and fishing as part of the state's effort for the restoration, management and public use of sportfish. In 1988, four new boat ramps were completed increasing the number of ramps built under this project to seven. Additionally, the Fish Division has obligated additional Dingell-Johnson funds to seven new boat ramps, one fishing pier and one boat lane marking project. A total of $3,022,426 has been obligated to boating and fishing access improvements since 1986.

Boat Ramp Maintenance

The Fish Division is responsible for inspection and maintenance of forty-one (41) Department boat ramps located throughout the state, which are used free of charge by the general public.

Maintenance and Upkeep of 14 Lakes Resulting From Act 858 of the Louisiana Legislature

Act 858 of the 1981 legislature dissolved the local state lake commissions of 14 lakes and placed the responsibility to maintain and upkeep said lakes directly under the Louisiana Department of Wildlife and Fisheries. These lakes include Anacoco Lake, Vernon Lake, Bundick Lake, Clear Lake, Smithport Lake, Cocodrie Lake, Lake St. Martin, Spanish Lake, Larto Lake, Corney Lake, Turkey Creek Lake, Hardwater Lake, Beauregard-Old River, and West Atchafalaya Floodway.

Coordination

This project administers, coordinates and supervises all federal aid fisheries projects (research, management, development, boating and fishing access) in the Fish Division.

Dingell-Johnson Fish Restoration Expansion

The 1984 Wallop-Breaux amendment to the Dingell-Johnson Act greatly increased the fish restoration programs in the state. In order to qualify for funding the state must match the federal monies (75%) with state funding (25%). This federal legislation mandated how the monies would be used within the states with a goodly portion going into providing fishermen access. These funds have been used for the construction of fishermen access areas (boat ramps, fishing piers, bank access, etc.) and future efforts will be made to enlarge and improve the division's hatchery system.

Carp Task Force

House Concurrent Resolution 188 of the 1988 Regular Session directed the Louisiana Department of Wildlife and Fisheries to create a task force to study the feasibility of legalizing certain carp species in Louisiana. The Fish Division organized the task force in August 1988 and met once a month beginning in September. The task force members included representatives from commercial and sportfishing groups, Louisiana State University, the Louisiana Farm Bureau Federation, the Louisiana Wildlife Federation and the Louisiana Catfish Growers Association. The group met to research and discuss available information on the grass carp, bighead carp and silver carp and the impact to Louisiana's environment and economy if their introduction were legalized. The task force is mandated to conclude their work and present a final report in early 1989.

Black Bass Task Force

In a response to concerns voiced by certain bass organizations, the Department initiated a black bass task force in October, 1988, of which membership included Freshwater Fish Division staff, LSU faculty, the Louisiana Wildlife Federation, major bass organizations and representatives from the private fisheries-related sector. This task force will provide guidance to the Department in the optimal management of bass populations in Louisiana. The Department will take recommendations to the Legislature or Commission, if necessary, to provide for changes in rules and regulations for the enactment of certain management recommendations.

Aquatic Plant Research and Control Section

This Section conducts research on troublesome aquatic plants in Louisiana waters, provides technical information on control methods, and supervises and conducts a statewide program of spraying waterhyacinths on public waters in Louisiana.

Waterhyacinth Control Program

During the fiscal year 1987/88, the aquatic weed control program provided substantial benefits to millions of Louisianians. Section crews, utilizing boats, airboats, mudboats and roadside spray units, effectively applied herbicide to 27,468 acres of Louisiana's freshwater wetlands infested with waterhyacinths. Another 4, 168 acres were treated by helicopter for a total of 31, 636 acres.

Special Control Projects

During the year, limited applications of specialized herbicides were used to relieve unusual and severe infestations of aquatic weeds in False River and Bayou Desiard, and other areas. These applications were temporary measures and served to familiarize local residents with safe and effective use of aquatic herbicides.

Research Programs

Ongoing research projects of the Aquatic Plant Research and Control Section include:

Evaluation of new herbicides to determine their availability and effectiveness for use in aquatic weed control.

Continued investigations into the affects of environmental conditions and water fluctuations on hydrilla, as well as evaluations of chemical, biological and mechanical methods of its control.

Lake Management Project

An important part of the stewardship of Louisiana's wildlife and fisheries resources is the skilled and professional management of the state's public lakes. Aquatic vegetation investigations were made by section personnel as to determine the status of aquatic weed infestation on 29 lakes. The primary objective of this work was to obtain accurate records of aquatic weed populations in these lakes which is necessary for the proper formulation of workable management plans. Species composition and density was determined on 9 lakes. As a result of these investigations, management recommendations were made for 6 of these lakes, 5 of which underwent drawdown procedures.

Noxious Plant Monitoring Program

An ongoing part of the section's responsibilities is the identification and monitoring of noxious non-native aquatic plant populations invading Louisiana's extensive wetlands. During 1988 twenty-seven lakes were type-mapped by Section personnel to determine and evaluate the encroachment of these plant species. In cooperation with personnel of the U. S. Army Corps of Engineers, a close watch is kept on the density, environmental impact and rate of spread of these introductions. A notable example is hydrilla, a submersed aquatic plant that was discovered in Louisiana in 1973 and is now spreading into many areas of the state with the potential of becoming a more serious pest than the waterhyacinth. Another more recent introduction, but also potentially quite troublesome species is salvinia. This relative new-comer to the state has begun making its appearance in several areas of South Louisiana and is being monitored very closely.

Technical Assistance Program

Section biologists provide advice and technical assistance to private pond owners and municipalities concerning aquatic vegetation management problems. In addition to offering professional recommendations for the establishment of proper management programs through this popular extension program, biologists also provide aquatic plant species identification assistance for the inquiring public on request.

Marine Fisheries Division

Major changes occurred to Louisiana's marine fisheries resource agency during 1988. The Office of Coastal and Marine Resources was reorganized into the Office of Fisheries. Most of the "Environmental Protection and Regulation" Subprogram was moved into the Department's Office of Wildlife. The Inland Fisheries Division was transferred from the Office of Wildlife and joined the Marine Fisheries Division in a new "Office of Fisheries". As a result of budgetary restrictions, 20% of Marine Fisheries Division personnel were laid off and three remote facilities were closed. Most operations at the Lyle S. St Amant Laboratory were suspended.

Shellfish Subprogram

Shrimp Seasons

The shrimping season in Louisiana's offshore territorial waters closed at 12:01 a.m. January 30. The closure applied to all state waters except in the area from Bayou Fontanell (Empire Ship Channel) west to Caminada Pass, where it applied only from the inside-outside shrimp line seaward for three miles. In that area state jurisdiction extends a short distance beyond the customary three-mile limit.

The offshore territorial waters south of Zone 3 (Texas state line to Southwest Pass near Marsh Island) reopened to shrimping at 12:01 a.m. April 4. The outside waters of Zone 1 and Zone 2 (Southwest Pass to the Mississippi state line) reopened at 12:01 a.m. April 30.

The shrimp trawling season in Zone 2 of the state's inshore waters opened 6 a.m. May 16; Zones 1 and 3 opened at 6 a.m. on May 25. The Commission had specified that the inshore season open statewide simultaneously in all three shrimp management zones, however a subsequent legislative resolution mandated a later opening in Zones 1 and 3. Biologists predicted that the 1988 catch of brown shrimp would approximate the 1987 catch of 48 million pounds, and that on opening day, the percentage of marketable size shrimp (at least 100 to the pound) would range from 45 percent in the centrally located Zone 2 to one percent in Zone 1 on the east and 0 percent in Zone 3 to the west. NMFS statistics later indicated that the 9.5 million pounds of shrimp landed in Louisiana during May 1988 was below the 12.8 million pounds landed in May of 1987.

The inshore season in Zone 2 ended at 12 noon on July 8 because biological samples confirmed the arrival of significant numbers of juvenile white shrimp in the inner marshes of the Zone.

The spring shrimp season in that portion of Zone 3 eastward from and including the Mermentau River and the Western shore of Grand Lake and Lake Arthur to Vermilion Bay closed at 12 noon July 11. The remainder of Zone 3 including Calcasieu Lake closed at 12 noon on July 17. The inshore season in Zone 1 closed at noon July 31, except for Breton and Chandaleur Sounds which remained open.

In an emergency action the Commission closed an area in Terrebonne Parish in the vicinity of Bayou du Large and Bayou Grand Caillou to all shrimping on July 8. Owing to a typographical error, the area had previously been mistakenly classified as being situated in the outside waters.

The fall inshore shrimp season opened at 6 a.m. on August 15 statewide. It closed at 12:01 a.m. December 21.

Interjurisdictional Fisheries

Louisiana continued to develop the long-term fisheries/environmental database which has been used for over 25 years to make management recommendations affecting marine fisheries. A portion of these activities are funded with Interjurisdictional Fisheries monies obtained through NMFS. This information is gathered by a routine sampling program in which trawl samples are gathered at over 100 locations in the estuarine and coastal area. These samples are taken as often as weekly in the spring, summer and fall months, and monthly in the winter months . In addition constant recorders located throughout the coastal area log salinity, water temperature, tides, rainfall, winds, and speed and direction of water currents. This information is augmented with data on daily rainfall, river discharge, and air temperature obtained from other organizations.

LOOP

The Louisiana Offshore oil Port (LOOP) monthly monitoring along a transect from the Intracoastal Waterway to twenty miles offshore from Grand Isle continued for the tenth year. This sampling consists of nekton, plankton, sediments, benthos, brine tracking, water chemistry and hydrology.

DOE

A Department of Energy funded project is monitoring brine discharge off the western coast of Louisiana. These offshore sampling efforts continue to provide a fishery independent database essential to fishery management decisions.

SEAMAP

SEAMAP sampling began in 1983 and includes offshore stations from the mouth of the Mississippi River to the offshore area south of Atchafalaya Bay.

MARFIN Shrimp Tagging

A MARFIN funded brown shrimp tagging project was undertaken in the area east of the Mississippi River. Movements of shrimp in this area are poorly understood.

Mollusc Subprogram

Oyster Seasons

The 1988/89 oyster season on the public oyster seed grounds except for Calcasieu Lake and Sabine Lake began 1/2 hour before sunrise on September 7. The Bay Gardene, Sister Lake, and Hackberry Oyster Seed Reservations also opened at that time.

The Bay Gardene and Sister Lake Reservations were opened for the taking of oyster seed for bedding purposes only; they closed 1/2 hour after sunset September 12 and reopened 1/2 hour before sunrise on September 21 for both bedding and sacking. The Hackberry reservation opened for both bedding and sacking. As scheduled, the Bay Junop Reservation was closed during this season.

The public grounds in Calcasieu and Sabine Lakes opened 1/2 hour before sunrise November 1 and remained open into 1989. Gear was restricted to tongs only. Provisions were made to prohibit the harvest if the state Department of Health and Hospitals declared those waters closed to shellfish harvesting.

Oyster Task Force

In 1988 the Legislature created an Oyster Task Force to study the downturn in oyster production and other management problems. Among others, the 13-member panel includes four legislators, spokesmen for the oyster industry, and representatives from the Louisiana Department of Health and Hospitals and the Department of Wildlife and Fisheries.

Lease Auction

An auction of all delinquent oyster leases was held on March 29. The auction included oyster leases on which rent was delinquent. Opening minimum bid for each lease was rental and penalty due.

Interjurisdictional Fisheries

Louisiana was able to demonstrate that adverse hydrological conditions on the public oyster grounds had reduced the amount of young oysters available to the oyster fishery. As a result, approximately 3/4 million dollars of Interjurisdictional Fisheries funds were obtained to rehabilitate the natural reefs. These funds will be used to plant clam shell for use as cultch by young oyster spat.

Seed Grounds

Salinity, a prime factor determining oyster production on Louisiana's Public oyster seed grounds and reservations, remained higher than optimal in 1988. The introduction of freshwater east of the Mississippi River resulted in localized oyster production, however, in general, production levels were low. Sampling indicated that in historically productive areas of Plaquemines Parish only 2,500 of the 13,000 acres of public reefs produced seed oysters. Those areas produced only 6% of the expected oyster seed needs during the 1988/89 season.

Caernarvon

The U. S. Army Corps of Engineers , with support from the Louisiana Department of Natural Resources and the Department of Wildlife and Fisheries, has developed a project for the controlled diversion of freshwater from the Mississippi River into the Breton Sound Estuary. The diversion structure will be located in the mainline Mississippi River Levee at Caernarvon, La. and have a design flow capacity of 8000 cubic feet per second. The effect of the diversion project on the estuary's ability to support wildlife and fisheries resources is expected to be significant.

Diversion of nutrient and sediment rich freshwater will rejuvenate existing marsh, significantly reduce dependence on local rainfall as the principal source of freshwater input to the estuary, reduce peak salinities and induce more regularity in the seasonal salinity pattern. Project benefits involve reducing land loss rate and increasing fish and wildlife production.

The Department of Wildlife and Fisheries conducts extensive monitoring activities in the Breton Sound Estuary. It has undertaken a diversion monitoring program to accurately measure the success of the diversion project. In 1988, the Department began a three-year prediversion monitoring program to establish base-line information. The monitoring program will extend for four years after the beginning of diversion activities to measure the effect of these activities.

Research Subprogram

At the end of 1988, the central element of the Division's Research Subprogram, i.e., the Lyle S. St Amant Marine-Laboratory was dramatically scaled back because of budgetary restrictions. The laboratory's 28 year history was marked by numerous research contributions which are providing tangible benefits to Louisiana and the Gulf of Mexico's seafood industry. While it is hoped that suspension of activities at this facility is temporary, its future at this point is uncertain. The major projects undertaken at the lab in 1988 were:

Shrimp

Since 1981, inshore brown shrimp populations in the Barataria Bay system have been sampled intensively before and after the opening day of the inshore season. This intensive sampling scheme is used on an annual basis to evaluate the efficiency of the inshore fleet in Barataria Bay and to determine the success of the opening date with respect to the 100 count/pound criteria. In 1988, approximately 35% of the inshore brown shrimp population was 100 count or larger on opening day (May 16) . The efficiency of the fleet was comparable to that observed in previous years with the marketable inshore population decreasing in weight by 69% during the first week of the season. This method of assessing the season's opening was expanded in 1988 to include all of Louisiana's coast. The percentage of inshore brown shrimp population 100 count or larger on opening day ranged from a high of 58% east of the Mississippi River to a low if 2% in Vermilion Bay.

Oysters

Over the past five years, the basis for management recommendations concerning the oyster seed grounds has been a forecast of seed oyster availability determined by a predictive model developed at the laboratory. The 1988 prediction indicated that the 1989 season would be no better than the poor production being seen on the primary grounds in 1988. A survey of the public oyster grounds in the Atchafalaya and Vermilion Bays indicated that high oyster densities in these areas would partially offset poor production expected from the traditional grounds.

Finfish

Sampling continued for a sixth year in a study to determine environmental parameters influencing distribution and abundance of young-of-the-year spotted seatrout and red drum. A cooperative king mackerel tagging project continued in association with the National Marine Fisheries Service.

Blue Crabs

A study addressing the annual variability in blue crab populations in the Barataria Bay system indicates that an inverse relationship exists between blue crab catch-per-unit-effort and springtime salinities.

Finfish Subprogram

Red Drum

On January 15, both commercial and recreational fishing for redfish was suspended by the Commission; this action was taken to relieve pressure on the stressed redfish resource. Commercial fishing was stopped because projections indicated that the legislatively mandated quota of 1.7 million pounds for the 1987-88 winter season had been reached. Commercial harvest was prohibited until August 31. Recreational harvest was suspended until June 1. This closure coincided with a shutdown on redfish harvest in all federal waters of the Gulf of Mexico. A procedural conflict resulted in suspension of the Commission's decision to shut down recreational fishing.

On February 4, the Commission held a public hearing in Houma to reconsider the action which had halted recreational fishing for redfish. After this meeting the Commission reaffirmed its decision to suspend recreational fishing for redfish and such fishing was prohibited from February 15 through June 1.

Legislation enacted in 1988 prohibited the commercial fishing of redfish from July 21, 1988 to September 1, 1991. The new law reduced the recreational creel limit to five redfish per day and set a possession limit of five. The minimum size was set at 16 inches; only one redfish 27 inches or longer could be taken per day.

Speckled Trout

The commercial harvest of speckled trout in state territorial waters was halted at midnight, May 6. The closure prohibited the commercial harvest, purchase, barter, trade and sale of spotted seatrout taken from Louisiana waters but did not prohibit dealers from possessing spotted seatrout legally taken prior to the date of the closure if appropriate records were maintained. Commercial harvest was suspended because technical projections indicated that the 1 million pound annual quota mandated by the legislature had been reached.

Legislation enacted in 1988 set the commercial quota at 1, 250, 000 pounds per year, with the commercial speckled trout season beginning September 1 each year. Once the quota is reached no vessel possessing or fishing any seine net, gill net, trammel net, or hoop net is allowed to have a speckled trout aboard.

Commercial mesh sizes for gill nets, trammel nets and seine nets other than strike nets increased to a minimum of 4 1/2 inches once the commercial speckled trout quota was reached. Minimum size for commercially taken speckled trout was set at 14"; all fish were required to have head and caudal fin (tail) intact when put ashore from a vessel or when sold.

Finfish Panel

At the end of 1988 the Department created a Marine Finfish panel to assist in developing a comprehensive plan for managing Louisiana's Gulf of Mexico finfish resources. Represented on the panel are the recreational and commercial fishing industries, the Senate and House natural resources committees, the Louisiana Department of Wildlife and Fisheries, the Louisiana Wildlife and Fisheries Commission, the Louisiana Restaurant Association and Louisiana State University's Coastal Fisheries Institute. The panel was conceived to examine the status of Louisiana's fisheries and to develop a comprehensive plan for managing marine finfish resources by providing a formal mechanism for the Department to receive input from the public and the scientific community regarding those resources.

A related Technical Working Group, formulated to provide biological expertise, is open to all state, federal, and university scientists with marine fisheries experience. The panel and working group are established and currently working toward their designated goals .

Monitoring

The saltwater finfish resources of the state are enjoyed by both commercial and recreational fishing interests. A comprehensive monitoring program was developed to protect or enhance these valuable resources by providing information regarding the status of fish stocks that occur in the coastal waters of Louisiana at some time during their life cycle. Three gear types are used coastwide to sample various year classes of estuarine dependent fish. A bag seine is used to sample young of the year and provide information on growth and movement. The seine is 50' in length, 6' in depth and has a 6' x 6 ' bag as an integral part of and midway the length of the net. The mesh size is 1/4" bar, 1/2" stretched, Delta 44 knotless mesh. A gill net is used to sample juvenile, sub-adult and adults and provide information on relative abundance, year class strength, movement and gonadal condition. The gill net is 750' in length, 10' in depth and constructed of monofilament. The net is composed of 5 panels, each of the following mesh sizes:

1) 150' x 10', 1" bar, 2" stretched mesh, minimum No. 104 filament.

2) 150' x 10' , 1-1/4" bar, 2-1/2" stretched mesh, minimum No. 177 filament.

3) 150' x 10' , 1-1/2" bar, 3" stretched mesh, minimum No. 208 filament.

4) 150' x 10' , 1-3/4" bar, 3-1/2" stretched mesh, minimum No. 208 filament.

5) 150' x 10', 2" bar, 4" stretched mesh, minimum No. 208 filament.

A trammel net is used to provide information on relative abundance, standing crop and movement. The trammel net is 750' in length, 6' in depth and constructed of nylon. The entire net has a 2 : 1 sag and the mesh sizes are as follows: Inner Wall -1-5/8" bar, 3-1/2" stretched, No. 6

twine; Outer Wall - 6" bar, 12" stretched, No. 9 twine. Gill net samples are taken semi-monthly, trammel net samples are taken monthly during October through March and seine samples are taken monthly. Hydrological readings (conductivity, salinity and water temperature) are taken one foot beneath the surface each time a biological sample is taken. Also, estimates of cloud cover, sea state, tide, wind direction and speed are taken each time a biological sample is taken. Samples are taken at specific locations arranged in such a manner so as to cover the beach, mid-marsh and upper marsh areas of all major bay systems throughout coastal Louisiana. The catch and hydrological information is summarized for each coastal area on a weekly basis to give the resource managers information as to the current condition of the resource. The pertinent life history information for the important species is also used in developing analytical and predictive models.

Menhaden

In addition to opening and closing the shrimp seasons, information from the trawl samples is used each year to develop a forecast for menhaden production. Meetings are held every year with menhaden industry personnel prior to the opening of the menhaden season to present catch forecasts and to discuss other matters relative to the menhaden industry. This year's meeting was held on February 24 and 25, 1988. Models for predicting commercial catches of gulf menhaden have been developed by department biologists. These predictive models are based on abundance of juvenile menhaden taken in the shrimp monitoring trawl samples the previous year and on hydrological and climatological data such as salinity, temperature, river discharge, wind direction, and tides, also from the previous year. Catch-per-effort of age-1 menhaden is predicted. Since age-1 menhaden comprise 90% and 67% of the catch in western and central Louisiana, respectively, the age-1 forecast also reflects on total catch. In addition, optimum hydrological/climatological conditions have been identified for the critical early life history stages, which occur from December to March. Relatively cold, dry winters are associated with good recruitment of age-1 menhaden into the fishery the following year. The cold, dry winter is characterized not only by low temperatures and low rainfall but also by low tide levels, low Mississippi River discharge, high salinity, low wind speeds and low incidence of southwest winds. The 1988 forecast was for an average age-1 year class to enter the fishery, and for an average or below average total harvest by weight. The 1988 menhaden landings for the Gulf of Mexico were 30% below the 1987 landings.

Artificial Reefs

Louisiana's Artificial Reef Program began in 1987 with the Legislature's acceptance of a comprehensive plan for sitting artificial reefs in both state and federal waters. The first reef was created in October of 1987 when Oxy Corporation donated the jacket of a large eight-pile structure. The structure, located in South Marsh Island-146, was toppled in place in one of the eight planning areas selected by the Artificial Reef Council.

Two more artificial reefs were created in 1988. Chevron contributed its South Timbalier-128 platform which is located in 102 feet of water approximately 20 miles southwest of Grand Isle. A cooperative effort between Exxon Corporation and Mobil Exploration and Producing, resulted in the transportation of a structure from offshore Texas to one of Louisiana's planning areas.

In addition to the structures, the participating companies donate half of their savings realized through participation in the program. These monies are placed into a trust fund for administration of the program and maintenance of the reefs. To date, over $500,000 has been deposited into the fund. In November of 1988 plans for the development of inshore reefs were initiated.

State/Federal Cooperative Fishery Statistics

Since 1983, the Coastal Fisheries Institute (CFI) at Louisiana State University has been working cooperatively with the Louisiana Department of Wildlife and Fisheries (LDWF) and the National Marine Fisheries Service (NMFS) in collecting urgently needed biological and catch/effort data on king mackerel in the western Gulf. This program was so successful that it has since been expanded to include other recreationally and commercially important fishes managed by the federal government such as reef fish and shrimp.

The information supplied by CFI to the NMFS over the last four years has been the only commercial data on king mackerel and red snapper available from the western Gulf for use by NMFS and Gulf of Mexico Fishery Management Council statisticians. The continuing goal of this project is to obtain catch/effort data, sex ratios, ages, and length frequencies of king mackerel, other coastal pelagics like spanish mackerel and tunas, and reef fish landed by both commercial and recreational boats in Louisiana.

MARFIN Red Drum

A MARFIN funded project entitled "Louisiana Red Drum Research" began in October 1986. The project objectives are as follows:

1) To assess estuarine escapement and migration.
2) To collect catch and effort data and length frequency composition of fish caught by commercial and recreational vessels in state waters.
3) To obtain and validate annulus formation in sagittal otoliths .
4) To determine age structure, growth rates, and reproductive biology.
5) To determine total, fishing, and natural mortality; and size at recruitment in Louisiana's fishery.
6) To develop an index of offshore stock abundance

6) To develop an index of offshore stock abundance from analysis of searching, sighting, and harvesting patterns of purse seine fisheries.

7) To assess the ability of existing and proposed regulations to attain the Council's 30% escapement guideline.

To date, 3,962 juvenile red drum have been tagged and released and 277 have been returned. Catch per effort, length frequency, and sex composition information have been collected from the commercial red drum fishery. Over 2,752 fish have been collected and aged under this project and validation of age estimates have been performed. We have also determined mortality rates by area, fitted a "double von Bertalanffy curve", developed an index of stock abundance, estimated escapement to a spawning pool, and recommended measures to attain the Gulf Council 's 30% escapement guideline.

MARFIN Mackerel

A tagging project was initiated by the Louisiana Department of Wildlife and Fisheries with the guidance of the National Marine Fisheries Service (NMFS) to begin answering the question of stock identification. Its purpose was to supplement previous tagging attempts by NMFS and to collect tissue samples for electrophoretic analysis.

To date, 477 king mackerel have been tagged and 228 tissue samples collected. Three fish have been reported recaptured. Two fish were recaptured off of Louisiana, one tagged in May 1987 and caught in August 1988 and another tagged in September 1987 and caught in June 1988 . The third fish was tagged in August 1987 and traveled to Fort Myers, Florida where it was recaptured in December 1987.

Wallop-Breaux

In 1988, Louisiana used the marine share of its Sport Fish Restoration funds in two activities; development of boat ramps to create access for fishermen and support of the Artificial Reef Program discussed above. Funds are provided to Louisiana State University through an Interagency Agreement for development and revision of the Louisiana Artificial Reef Plan.

Office of Wildlife

The Office of Wildlife, supervised by one of two assistant secretaries reporting directly to the Department Secretary, oversees the state's game and non-game wildlife resources. The office is comprised of three divisions, Habitat Conservation, Game and Fur and Refuge.

Habitat Conservation Division

Ecological Studies Section

In 1988 the Ecological Studies Section was incorporated into the Habitat Conservation Division along with the Louisiana Natural Heritage Program and the Department's Non-game program. Although having been combined, the basic mission and functions of each of the three sections remained essentially unchanged.

Louisiana continues to lose valuable fish and wildlife habitat to development projects of various agencies of federal, state and local government and to projects of private enterprise. Federal, state and local laws and procedures allow the Louisiana Department of Wildlife and Fisheries to review projects and evaluate the probable effects of the projects on fish and wildlife resources. The Department of Wildlife & Fisheries is charged by the Louisiana Constitution "to protect, conserve and replenish the natural resources of the state, the wildlife of the state, . . . ," and is, therefore, the appropriate state agency to investigate and assess the condition of fish and wildlife resources in different portions of the state.

Ecological Studies objective is to gather and compile data on the fish and wildlife resources, their potential and their needs in the areas of project influence and to provide technical assistance by making obtained information available to project planners and sponsors. Fish and wildlife information is essential to sound planning of land and water management projects and to proper decision making in various government programs.

I. Environmental Investigations:

A. Affected Agencies:

1. The United States Army Corps of Engineers both as a construction agency and a permitting agency has a need for fish and wildlife resource data from specific areas. The Corps is the principal agency promoting navigation and flood control projects in the state and its activities nearly always pose a serious threat to fish and wildlife. Further, the Corps is the permitting authority for projects in wetlands and adjacent waters of the United States.

2 . The United States Department of Agriculture: At least two agencies of the USDA, the Soil Conservation Service and the U.S. Forest Service are required to review their projects in light of possible effects that they may have on fish and wildlife resources. They frequently need fish and wildlife data in their project decision making.

3. Other Agencies and the Private Sector: A number of other agencies such as the FHWA, EPA, FFA, FHA, HUD, Louisiana Department of Transportation and Development, Louisiana Department of Natural Resources, Louisiana Department of Environmental Quality, and the Louisiana Department of Culture, Recreation and Tourism often have need of fish and wildlife information for use in planning and decision making. Additionally, private developers and consultants who wish to apply for permits through some of the above regulatory bodies are required to secure certain environmental information in order to comply with the permitting requirements. The Louisiana Department of Wildlife and Fisheries is the appropriate source of this information.

B. Activities:

Some of the major projects investigated during FY88 were: Freshwater diversion projects, Hurricane Protection Levee projects, navigation projects, marsh management plans, airport construction, Community Development Block Grant projects, Farmers Home Administration Projects, Statewide Flood control Projects, Solid Waste Disposal Permits, Hazardous Waste Disposal Permits, Hydropower projects, other types of dam projects, coastal erosion and restoration projects, several hundred 404 and Coastal Use Permit Applications, and numerous requests for information from both government and the private sector on matters related to fish and wildlife.

II. Research and Survey:

A. Scenic Rivers Surveys

No intensive Scenic Rivers Surveys were conducted during 1988-89, however, section personnel conducted or participated in field trips, and meetings and reconnaissance surveys on scenic rivers. Additionally, computer data bases were investigated to gather the physical, biological and land use information necessary for evaluations.

B. Other Research

Several Habitat Evaluation Field trips were conducted during the FY in conjunction with major land modification projects. Most other research was limited to literature searches.

III. Other permitting:

A. Scenic Rivers Permits

During FY88 the Ecological Studies Section reviewed 11 permit applications, issued 6 permits, revised 1 and 4 are pending.

B. Fill Material Permits

During FY87 the Ecological Studies Section reviewed and issued three fill material permits for removal of fill from the Mississippi River. Additionally, we reviewed and requested payment of fill royalty from several dozen individual fill material removal projects.

C. Mariculture

As a result of repeal of RS 56:13 one mariculture permit was cancelled, but was given a period of 2 years to come into compliance with the remaining statute. An annual fee of $1000 was imposed upon mariculture operators permitted under RE 56:579.1. One permit was revoked for failure to secure a Coastal Use Permit and one permit was withdrawn by the permittee for economic reasons. There are currently 7 valid permits for the mariculture of Red Fish in coastal Louisiana. Five (4) permits Lafourche Parish, one (2) in St. Bernard, and one (1) in Terrebonne.

IV. Scenic Rivers Task Force:

The 1987 session of the Legislature adopted HCR 139 which established a task force within the Department of Wildlife and Fisheries to review the existing scenic rivers program and develop recommendations for administrative and legislative changes as may be required to improve the Department's scenic rivers management capabilities. The task force is composed of representatives of major user and landowner groups and state agencies which currently have responsibilities for reviewing and evaluating scenic river permit applications.

During 1988-89, section personnel participated in regular meetings of the task force and its sub-committees and in task force sponsored activities. A coordination meeting with the National Park Service for the development of a scope of work designed to survey and catalog existing environmental conditions along the several streams was conducted followed by a workshop for the participants. The surveys will begin by the first quarter of 1989 and management plans for the several streams will be developed based upon the data collected.

Louisiana Natural Heritage Program

The Louisiana Natural Heritage Program (LNHP) is a comprehensive, computer-assisted state ecological inventory. The program was transferred from the Department of Natural Resources July 1, 1986 to the Department of Wildlife and Fisheries and administered by the Fur and Refuge Division until 1988 when it became part of the Habitat Conservation Division. The heritage staff is comprised of a coordinator, botanist, zoologist, ecologist, and secretary. The Nature Conservancy is presently under contract to provide a landowner contact to register LNHP sites. The primary objectives of the LNHP are:

1) To gather information systemically and on a continuing basis on the occurrences of rare, threatened and endangered (r/t/e) species and significant ecological features of the state, including outstanding examples of native ecosystems, and critical areas benefiting the environment;

2) To assemble and store this information efficiently in our data management system;

3) To make data retrieval utilitarian and cost-effective so that the potential impact of various activities on identified lands can be evaluated; and

4) To set rational conservation plans. Information about the status and distribution of r/t/e species, natural communities, and other special features in the state is collected and stored in a centralized data management system. Map files, annual files, and computer files keep information well-organized and easily accessible. Records are indexed by name, location, status, watershed, and land ownership creating a flexible user-request system.

The LNHP provides practical, up-to-date information to public and private policy-makers. Applications of the data base have been used in virtually every aspect of biological conservation.

During 1988, 192 data requests were answered and more than 550 permit applications for state and federal permits were reviewed, including reviews of community development projects, U.S. Corps of Engineers permit applications for the entire state, Coastal Management Division's coastal use permits, as well as requests from EPA, universities, individual citizens, other state agencies, and private conservation organizations.

The LNHP database contains 529 elements in three classes: special plant, special animal, and natural communities. One or more occurrences have been identified for 89 percent of these elements. Of the more than 3,200 element occurrences now on file in the data base, 1,435 are locations of special plants, 1,177 special animals, 405 natural communities and 281 are unique features such as waterbird nesting colonies. The data base also includes information on 251 managed areas within the state as well as 2,474 source abstracts. In previous years the LNHP developed the first statewide natural community classification system with seven natural community systems containing 75 distinct communities. The Heritage Program has located high quality examples of 85 percent of the communities with a state rank of SIS3 (endangered-rare) . Over 230 sites were surveyed by Heritage staff in the past year, focusing on areas and communities in need of field research. The first comprehensive list of rare, endangered, and threatened species of plants and animals was developed by the LNHP in 1985. Of the approximately 2,500 species of vascular plants native to Louisiana, about 310 (12.4 percent) are rare or warrant further consideration to determine their status. Records of all known localities of 294 of 310 species have been computerized with 25 percent of these rare plant locations discovered or updated since 1985 by LNHP personnel. The Special Animal list includes 21 species of invertebrates, 28 mammals, 11 amphibians, 26 reptiles, 47 birds and 34 species of fishes. All known occurrences have been computerized for over 61 percent of these species.

The Vertebrate Characterization Abstract (VCA) is another data base of the LNHP. The VCA is a record of various attributes of each vertebrate species' taxonomy, phenology, distribution, habitat, food habits, activity patterns, and reproduction and development. The initial data entry for all 890 Louisiana vertebrates was completed in 1987 and updated in 1988. Other major accomplishments of the LNHP during 1988 include:

1) Publication of Plants and Animals of Special Concern in the Louisiana Coastal Zone;

2) Completed status surveys for two plants that are U.S. Fish and Wildlife Service candidates for federal listing;

3) Continued reviewing U.S. Forest Service compartment prescriptions for sensitive species management recommendations; recommended Research Natural Area designation for Keiffer prairie in Kisatchie National Forest and began work on delineating boundaries for sites to be registered as natural areas with LNHP/ Louisiana Nature Conservancy;

4) Continued botanical and invertebrate survey of Keiffer Prairie in Kisatchie National Forest (KNF) ;

5) Served as technical advisors to the Louisiana Nature Conservancy, Scenic Streams Task Force, Wetlands Priority Conservation Plan, Project Wildflower, Capitol Lakes Task Force, Society of American Foresters' Red-cockaded Woodpecker Committee, and State GIS Committee;

6)Cooperated with the U.S. Army Corps of Engineers to designate 10-20% of Bodcau Wildlife Management Area as a Research Natural Area;

7) Coordinated/conducted 37 statewide Breeding Bird Surveys; 8) Initiated field research, in conjunction with LSU and the U.S. Fish and Wildlife Service, to determine the subspecies and status of black bear in Louisiana;

9) Initiated the process of obtaining a Section 6 Cooperative Agreement with the U. S. Fish and Wildlife Service, which will allow LDWF to receive federal funds for conducting endangered species research;

10) Initiated aerial survey of waterbird nesting colonies in coastal Louisiana. We examined 139 colonies in eastern Louisiana, 21 of which were not previously documented. The remainder of the state will be surveyed in 1989.

Nongame Wildlife Program (NWP)

A number of nongame projects were continued from the previous year or initiated during 1988. The inventory of nongame birds on Sandy Hollow Wildlife Management Area continued and should be completed in March 1989. Additional eastern bluebird boxes were also installed on the WMA. Aerial surveys of nesting ospreys were conducted to better understand the status of the bird in Louisiana. Eight flights were conducted along 38 water bodies north of Alexandria and in areas of potential habitat southeast of Lafayette. Four active nests were observed. Seven young were fledged.

The booklet on Louisiana hummingbirds was completed, and the contract for printing should be completed in the near future. An article on shrikes was submitted and published in the Louisiana Conservationist. A contract for $5,000 was initiated with the LSU School of Veterinary Medicine for operational support of the Raptor Rehabilitation Unit. Out-of-state travel included attendance at the Raptor Symposium in Virginia.

Game Division

Land Acquisition

In the early 1960s, the Louisiana Department of wildlife and Fisheries began purchasing property to dedicate to wildlife and the sportsmen of the state. A total of 332,866 acres has been purchased as a result of this Department's aggressive land acquisition policy.

Due to serious financial problems, no new properties were added to the Department's existing lands in 1988. Many excellent tracts were available for purchase at reasonable prices but money was not available. Hopefully with the advent of new concepts initiated this year (e. g., Louisiana Waterfowl Conservation Stamp and Print), a stable source of funding will allow the Department to once again acquire land, and thereby provide additional acreage for wildlife and for public recreation. It is important that land acquisition becomes a high priority in order to protect and conserve Louisiana's wildlife habitat.

Forestry Section

Timber sale activities continued this year on Department owned WMAs with seven sales awarded to contract and five sales rejected due to low bids. Areas with awarded contracts were Ouachita, Pearl River, Russell Sage, and Three Rivers. Additionally, Saline and Spring Bayou had sales awarded for the first time since acquisition. Bids were rejected for sales on Big Lake, Pearl River, Saline, and Sherburne.

Timber stand improvement work was continued by Department personnel in the Red River WMA plantation. Assistance was provided to the Upland Game crew for prescribed burning management on Sandy Hollow WMA. A new firewood cutting program was established and prepared for operational use to improve habitat on the WMAs.

Growth monitoring plots were established on Ouachita and half completed on Pearl River WMA. Plans are to complete establishment of these plots on 3 WMAs each year and then begin collecting growth data every 5 years. Detailed habitat data being collected will guide this section toward the correct habitat management program for each area. Timber inventory work continued on the WMAs with emphasis on Boeuf and Sherburne WMAs. Reforestation activities continued on Ouachita and Pomme de Terre WMAs and underplanting activities increased on Attakapas Island WMA; species planted included Nuttall oak, cherrybark oak, willow oak, water oak, Shumard oak, cow oak, overcup oak, sweet pecan, and cypress. Acorns collected statewide by Department personnel were utilized for direct seeding in these projects and for seedling stock custom grown at the LDAF Columbia Nursery. Survival monitoring of these plantings was continued by the respective district personnel.

The hard work and determination of Department personnel involved in this section's bottomland hardwood reforestation projects have reflected in a positive manner on the Department and resulted in numerous inquiries from throughout the southeastern United States as other federal, state, and private agencies and individuals endeavor to restore national wetlands.

The annual mast survey was compiled from district surveys of WMAs mast abundance. Changes made in the mast production ranking were put into effect and will represent a truer picture of the annual production on the Department's areas in the future. The Nuttall oak mast crop was very good this year on most of the areas, providing an abundant supply of acorns for reforestation projects as well as the area wildlife.

Cooperative work continued on USDA Forest Service lands with 51 Ranger District compartment prescriptions and amendments reviewed. Additionally, review was made of USDA Forest Service's cattle grazing regulations and the DEIS for Vegetation Management in the Coastal Plain/Piedmont. Other meetings and workshops attended in cooperation with USDA Forest Service included: Forest Awareness Week, Southern Forest Management Chiefs Tour in Alabama, and Fire Training School.

Other committees served on, meetings and miscellaneous work done for this year include: FAC Land Use Committee — review of Louisiana Coal Mining Regulations; LFA Wildlife Committee — assisted with annual wildlife management tour; Scott Paper Co., Mobile, Alabama — tour of operations in Mobile Bay area; informational working tour of Louisiana wetlands for a group of policy writers from Washington, D.C.; coordination of forest management practices on Atchafalaya National Wildlife Management Preserve with USFWS; coordination of wetland reclamation on private lands with U. S. Army Corps of Engineers; informational tours of Ouachita WMA reforestation project for State Extension Service and Louisiana Tech University Forestry Camp; coordination of management and management review efforts on WMAs and National Forest Lands with Louisiana Natural Heritage Program; cooperatively established a timber thinning study in the cypress-tupelo swamp on Pearl River WMA; submitted for State champion tree recognition a sweet pecan, black willow, chinquapin, and sweetgum; and assisted District III with National Hunting and Fishing Day presentation.

Examination of private and industrial timberlands was continued in a cooperative effort with district personnel, resulting in recommendations for wildlife and timber management on these lands to improve wildlife habitat.

This section also participated in an increased enforcement effort during the 1988-89 hunting seasons, making waterfowl and resident game bag checks and enforcing wildlife regulations.

Review of the section's timber harvest and associated forest management practices on WMAs was continued as hardwood forest researchers from North Carolina and Louisiana toured and critiqued ongoing projects. Comments received are utilized to improve wildlife/forestry management programs on WMAs.

Two new employees were added to the Forestry Section during the Spring of this year. This addition increased the capability of the section to cover more ground and initiate more habitat management work on the WMAs. However, the section was effectively set back again as one employee was lost during the layoffs.

Research Section

The Research Section gathers data on game birds and animals, largely for use in formulating hunting regulations. Separate programs monitor the population status of dove, deer, waterfowl, turkey, and upland game birds.

Doves

Maintaining the mourning dove population in a healthy, productive state is the primary dove management goal. This concept is designed to provide recreational opportunities for both the hunting and non-hunting public. The management program includes population surveys which are necessary to provide information for properly regulating the harvest.

The dove population in the Spring has been monitored on a nationwide basis since 1953 by a call-count survey along approximately 1,000 randomly-located routes. The survey takes a measure of the doves heard cooing during the nesting season along certain roadsides throughout the country. Each route is located along lightly-traveled roads and has 20 listening stations spaced at one-mile intervals. At each stop, a biologist records the number of doves heard calling during a 3-minute period. The counts begin one-half hour before sunrise and continue for 2 hours. This count of calling doves is used by the U. S. Fish and Wildlife Service to decide how many days of hunting each state will be allowed and how many doves per day hunters will be permitted to bag. States may then select the season they prefer during this framework .

Louisiana's dove population is monitored along 19 routes randomly located throughout the state. In May 1988, an average of approximately 14 doves per route was recorded. There was no change from 1987 , which indicates a stable but relatively low dove breeding population for Louisiana.

Dove hunting regulations for 1988 were again set at 70 days with a bag limit of 12 birds. Shooting hours for the 1988 season remained unchanged from the year before allowing all-day hunting, except on opening weekends of each segment when hunting was restricted to afternoons only. This compromise seems to have satisfied most Louisiana dove hunters.

Dove populations at the present time seem to be controlled primarily by changes in agricultural and other land use practices. As with almost every species of game bird and animal, habitat remains the single most important factor affecting their numbers; altering the carrying capacity of the habitat affects the population drastically.

While the dove breeding population in the eastern United States has remained relatively stable for the past 20 years, there has been a decline within certain sections of Louisiana. The breeding population in the southern portion of the state has gradually declined as agricultural patterns have been altered. The habitat has changed to one which cannot support as many breeding birds; thus, numbers have dropped.

As is the case in other Gulf Coast states, Louisiana serves as the wintering home for doves hatched and raised in the northern tier of states. The cold winds of late fall and winter force migration to our state; it is estimated that over half of the annual harvest of doves in Louisiana is made up of migrant birds. This is no small number, as the average kill of doves in Louisiana amounts to approximately 1-1/2 million birds annually.

Research over the past decade has shown the harvest of birds occurs during 3 distinct time periods. The first harvest period occurs during the early season in September. Its success or failure depends almost exclusively on locally raised birds. The second harvest period covers the entire state during the time period from mid-October through mid-November. The number of birds available to hunters at this time depends to a great extent on the migrant flocks which move into the state. The final period of extensive harvest is during the months of December and early January. The kill is of both local birds and those which have migrated down from the states north of Louisiana. It is an excellent time for shooting doves, but many Louisiana hunters do not take full advantage of the hunting opportunities for doves as all of the game and bird seasons in the state are usually open at this time, each claiming its share of Nimrods.

With these three distinct harvest periods in mind, one can easily see why the Louisiana Wildlife and Fisheries Commission sets a three-way split season. There can be little doubt that this arrangement of hunting seasons affords most dove hunters the greatest chance of taking a fair share of the birds as it offers hunters the opportunity to hunt in an area and at a time when doves are most abundant.

As interest in dove hunting has increased over the years, finding a place to hunt, particularly during the early September segment, has become more difficult for Louisiana hunters. The Game Division plants brown-top millet and wheat on 2 wildlife management areas which, in some years, has attracted concentrations of doves and provided good hunting for the public. Fort Polk WMA in southwest and Sandy Hollow WMA in southeast Louisiana, both furnish excellent dove hunting during some years. Finding a place to hunt, however, remains the greatest challenge facing today's Louisiana dove hunter.

Deer

Biological data essential to the state's deer program were compiled on wildlife management areas during managed deer hunts open to the public. At 24 major deer areas, biologists at daily check stations obtained research and management data from 3,002 deer kills made by 48,077 hunters.

Veterinary health surveys were conducted in seven herd areas — one each in Jackson and West Feliciana plus two in East Feliciana Parish. In-depth studies focused on the deer herds of Red Dirt National Management Preserve in Natchitoches Parish, the D'Arbonne National Wildlife Refuge (NWR) in Ouachita and Union Parishes, and the Tensas NWR in Tensas and Madison Parishes. These surveys were made in conjunction with the Southeastern Cooperative Wildlife Disease Study.

A 13 member Deer Management Task Force, representing the majority of all organized interest groups, was formed for the purpose of refining the state deer management program. Monthly sessions were held September 1988 through February 1989 and a formal report of findings and recommendations was received by the Wildlife and Fisheries Commission on March 1, 1989. The contribution of the Deer Management Task Force is expected to bring increased benefits for this valuable wildlife resource as well as for the sportsmen and other citizens of the state.

Other deer work in 1988 included deer range and population surveys with management guidance provided on 833 areas participating in the state's Deer Management Assistance Program. This is a 546% increase in participation since its beginning in 1981. In addition to soaring recreational values, many poor quality deer herds are being improved through sound scientific management on more than 1,782,488 acres currently enrolled in the program.

Waterfowl

Louisiana has approximately 3.5 million acres of coastal marsh that winter large and diverse waterfowl populations. Aerial waterfowl inventories of the entire coastal marsh and in north central and northeast Louisiana are conducted each winter. It is estimated that five million waterfowl migrate down the Central and Mississippi Flyways to winter in Louisiana. The mid-winter inventory indicated 5.3 million waterfowl in the coastal marsh and inland areas of the Mississippi Delta during January of 1989.

Duck hunters this year in Louisiana and across the country faced the most restrictive hunting regulations in the past 15 years. The conventional bag system was used for the first time since 1972 with hunting days reduced to 30 statewide. Preliminary harvest information indicates reduced hunter participation and success with a significant reduction in total harvest anticipated.

In the 1987-88 season, 97,000 hunters bagged 1.2 million ducks. These figures represent an 8% reduction in the number of hunters, with the duck harvest basically unchanged from the previous year. Species composition was green-winged teal (21%), mallard (20%), blue-winged teal (19%), wood duck (10%), gadwall (9%), with pintail, shoveler, wigeon and ring-necked comprising most of the remainder. Goose harvest increased by 16% in 1987-88 and approached 60, 000. White-fronted geese comprised 53% of the harvest with blue and snow geese accounting for the remainder.

The Louisiana Waterfowl Conservation Stamp and Print Program was created by the Legislature during 1988. All waterfowl hunters 16 years or older will be required to purchase a stamp beginning in 1989. Revenues generated from the sale of stamps and prints will be used by the Department for wetland acquisition, enhancement, and other projects to benefit waterfowl.

Wetland habitat projects utilizing Ducks Unlimited MARSH funds were implemented on three state-managed WMAs this year. Work was completed on the Ouachita WMA where agriculture fields were converted to managed wetlands with a variety of management schemes developed. Moist soil areas are currently being completed on 800 acres on Soda Lake WMA and 2, 000 acres on Pomme de Terre WMA. The Department has also been involved with coordinating the implementation of the North American Waterfowl Management Plan. Several joint efforts involving private individuals, and state and federal agencies have been developed to improve the quantity and quality of Louisiana's waterfowl wintering habitat.

Turkey

During 1988, the primary emphasis of the turkey section was centered around the restocking of North Louisiana and the field testing of turkeys for *Mycoplasma gallisepticum*. A total of 256 turkeys was captured throughout the state and relocated in the parishes of Caddo, Webster, Claiborne, Union, DeSoto, St. Landry, and Iberia. This figure represents the third highest yearly total for the capture of wild turkeys since 1962.

A total of 79 turkeys was checked by our field biologists for *Mycoplasma gallisepticum* and all test results were negative.

For the first time, Louisiana turkey hunters were asked to check their kill in at a voluntary weigh station. There were 185 stores throughout the state which weighed in 1,514 birds. Of this number, 76% were adults while 24% were juveniles.

Results from the 1987 Big Game Harvest Survey indicated that 16, 300 hunters harvested 10,100 gobblers. Louisiana sportsmen spent 130,000 days afield pursuing one of the fastest growing sports in the state.

Development Section

Wildlife Management Areas

The primary function of the Development Section is to establish, maintain, develop, and manage wildlife management areas (WMAs) in the state. The Department of Wildlife and Fisheries operates 39 WMAs, with Game Division managing 35 of these areas. A total of 1,107,402 acres is contained within the 39 WMAs, with the Department owning in excess of 332,000 acres.

It is estimated that over one million man-days of recreation are afforded each year to the public. Hunting and fishing comprise the bulk of recreational activity but nonconsumptive usage is growing each year. Wildlife management areas offer not only hunting, fishing, and trapping, but also provide an opportunity for birdwatching, camping, canoeing, sightseeing, boating, and other outdoor related activities.

Expenditures of time and money are necessary to maintain roads, camping areas, boundaries, bridges, water control structures, and other Department owned facilities. Road construction and maintenance on all areas plays a significant role in providing access for the public to enjoy the various forms of outdoor recreation.

As lands throughout the state become leased for hunting, the importance of WMAs in furnishing a place for the public to enjoy the outdoors is rapidly increasing. Timber companies continue to lease properties that were once open to the public-at-large. As this trend continues, many displaced hunters must look to the Department to provide lands for outdoor enjoyment, which has resulted in an increased participation on Department operated WMAs.

District Activities

The Game Division is divided into 7 geographical districts for wildlife management and administrative purposes. There were 8 districts but realignment of district lines resulted in 2 districts (Opelousas and Baton Rouge) assuming the responsibilities of the New Orleans district. Each district maintains an office with the district supervisor being responsible for activities within the geographic region. Support personnel include wildlife biologists, wildlife management area supervisors and specialists, and secretarial staff. Game Division district personnel are responsible not only for wildlife management areas in the district but any other wildlife related programs.

On-going district activities include conducting deer range surveys and gathering biological data on other game species. This information is used to develop recommendations that are presented to the Commission for the setting of annual hunting seasons. Other routine activities include working on the wildlife management areas, conducting managed hunts, overseeing trapping activities, checking hunter success, and improving wildlife habitat. Food and cover is improved by burning in the pine uplands, planting food plots, and closely regulating logging activities on state owned areas.

Considerable time is spent in the winter trapping and releasing of turkey on suitable sites across the state. Also during the winter, several districts are heavily involved in trapping and banding waterfowl. Assistance is provided to other divisions in fur and fish related management, research activities, and law enforcement. The districts play a valuable part in providing technical assistance to many landowners interested in providing or improving wildlife habitat on their property. Increased interest in the Deer Management Assistance Program has resulted in increased time and man-power devoted to this popular program by Game Division personnel. Preparing annual reports, updating long-range wildlife management plans, and budgeting requires considerable time of the district supervisor and his staff of biologists.

Game Division district supervisors, in addition to biological work, are also charged with the entire responsibility for managing district offices. This includes all grounds and building maintenance as well as janitorial work and repairs.

The activities of all districts and their staff within the Game Division are coordinated through the Baton Rouge office to provide for better management of the state's wildlife resources.

District I

The District Supervisor and Biologist were involved in planning and supervising all projects associated with WMAs as well as providing assistance on statewide projects. District personnel attended a staff meeting, met with civic groups, and worked with deer clubs and on land leases. Various other projects included confiscating pen-reared wild turkeys and meeting with WMA landowners.

District personnel also made deer range surveys, submitted hunting season recommendations, and released wild turkeys on selected release sites for restocking purposes. The District Supervisor worked with Barksdale A.F.B. officials on the M-X Missile Project in assessing the environmental impact of the project and to seek mitigation if this site is selected.

District II

District II includes the entire northeastern Louisiana parishes of East Carroll, Jackson, Lincoln, Morehouse, Ouachita, Richland, Union, and West Carroll. These parishes have a combined area of 4,780 square miles. Included within the district are the Georgia-Pacific, Ouachita, Russell Sage, and Union WMAs.

District personnel trapped 22 wild turkeys from East Carroll and Ouachita Parishes as a part of the Department's restocking program. A total of 37 turkeys were stocked on 2 sites in western Union Parish. Several potential turkey stocking areas were surveyed. Data from hunter-bagged turkeys were collected from 25 check stations throughout the district. Two turkeys were submitted to veterinarians for disease and parasite analysis.

One hundred thirty-seven hunting clubs participated in the Deer Management Assistance Program. Biologists spent considerable time conducting field surveys, attending club meetings, preparing recommendations, issuing tags, and analyzing data. District waterfowl trapping efforts resulted in the banding of 1,059 ducks at Coulee Refuge. Technical advice was provided to landowners for the management of deer, waterfowl, turkey, upland game, non-game wildlife, and timber.

Programs were presented to sporting, civic, and governmental organizations. Hunting season recommendations were formulated and presented for consideration to the Louisiana Wildlife and Fisheries Commission. Considerable administrative time was spent in budget preparation, preparing 5-year wildlife management area plans, updating long range wildlife management area plans, district office management, issuing special crossbow and handicap ATV permits, purchasing, and preparing various reports. A National Hunting and Fishing Day observance was held at the district headquarters which was attended by more than 2, 000 persons.

Managed public hunts for deer, waterfowl, squirrel, rabbit, quail, dove, raccoon, and wild turkey were conducted on district wildlife management areas. Trapping seasons for furbearers were held on each area. Road and bridge repair, operation of water control structures, levee construction and repair, water pumping, food plot planting, and boundary marking are a few examples of the activities carried out on the wildlife management areas. Law enforcement and maintenance duties were performed on each area.

Construction of a 1,700 acre waterfowl management project on Ouachita Wildlife Management Area, in cooperation with Ducks Unlimited, was 99% completed during the year. A waterfowl observation tower was constructed for public use. Hardwood seedlings and acorns were planted on 569 acres of reclaimed farmland on Ouachita Wildlife Management Area. District personnel collected 1,276 pounds of seed for the project. Approximately 240 acres of timber on Russell Sage Wildlife Management Area and 200 acres on Ouachita Wildlife Management Area were logged for wildlife habitat improvement. An additional 166 acres of timber on Russell Sage and 144 acres on Ouachita were marked for thinning. An experimental 16-day either-sex deer season was initiated on Union Wildlife Management Area resulting in the harvest of 222 deer, the most successful season ever on this area.

District III

District III personnel trapped approximately 60 wild turkey for relocation within the state. These birds were trapped on the WMAs within the district. In addition to trapping birds for relocation, district personnel also captured wild turkeys on Red Dirt National Wildlife Management Preserve in conjunction with a research project being conducted by Northwestern State University. These birds were fitted with telemetry units and released on site.

Upland game research assistance was also provided by district personnel in the form of running bobwhite quail and mourning dove survey routes . In addition, quail wings were collected from hunters to be used in population studies.

A considerable amount of man-hours were spent working with hunting clubs in various capacities. The primary activities were associated with deer habitat surveys and harvest recommendations. There was a 20% increase in the number of clubs participating in the DMAP. However, there are still relatively few clubs enrolled in this program in District III as compared to other districts. This is due primarily to the fact that hunting leases are just becoming established in many areas within the district. The current trend is toward more leasing activity in all areas of District III.

Other deer related activities included a parasite study in conjunction with the Southeastern Cooperative Wildlife Disease Study group that was conducted on the Red Dirt Area. In addition, a number of illegally captive live deer were confiscated and transported to appropriate facilities.

Boise Vernon WMA recorded an excellent deer kill in 1988; more deer were harvested than in any past hunt. The early bucks-only season was also very successful.

Activities on the 5 WMAs in the district were fairly routine. Due to cooperation with the State Office of Forestry, an additional 600 acres was made available for hunting on the Alexander State Forest WMA. Also, food plot planting was expanded on this area to total approximately 30 miles of strips. Through cooperation with local D.O.T.D. officials, 3 highway signs have been erected indicating access points to Sabine WMA.

All divisions in the district participated in the first National Hunting and Fishing Day exposition held in the Alexandria area. The Department provided displays, information booths, wild game cooking samples, and various demonstrations. Overall, the event was quite successful.

District IV

District IV is located in North Central Louisiana and is comprised of 7 parishes: Caldwell, Catahoula, Concordia, Franklin, LaSalle, Madison, and Tensas. The district headquarters is located in Ferriday. Wildlife habitat is diversified and ranges from the pine-hardwood uplands to the bottomland hardwoods of the Boeuf, Black, Red, Ouachita, Tensas, and Mississippi River Systems.

A variety of native, furbearing, and migratory species occur in District IV where suitable habitat is found. Excellent deer and turkey seasons were recorded this year. Squirrel and waterfowl harvests were lower than usual over most of the district.

There are 6 wildlife management areas owned by the Louisiana Department of Wildlife and Fisheries in District IV, totalling approximately 178,000 acres. Managed hunts were conducted on the wildlife management areas for resident and migratory game species. Either-sex deer seasons were held on 5 wildlife management areas with 15,665 hunters harvesting 1,435 deer, which was 51% of the total kill on all Game Division wildlife management areas through the Thanksgiving weekend hunt.

District IV Game Division activities of 1988 encompassed a wide variety of wildlife related services, including operation of district headquarter facilities, management of Catahoula Lake, formulation of hunting recommendations, and development and maintenance of wildlife management areas.

Game Division district employees assisted the Refuge Division with alligator research projects and regulating the alligator season. A total of 167 tags were issued and 122 animals were harvested for a 73% success ratio. Most alligators were taken in Concordia, Madison, and Tensas Parishes. Public lakes and water bodies included in the hunt were St. John, St. Joseph, Lower Sunk, and Silver Lakes. Also, 5 fur animal census routes were conducted in the district and data were given to Refuge personnel for analysis.

In 1988, the Deer Management Assistance Program was continued with 83 clubs participating and 2,866 antlerless deer tags issued. This project involved field investigations, recommendations, and formulation of a sound deer management program. Antlerless deer tags were issued to participants that could not harvest the recommended number of deer during the regularly scheduled either-sex hunt.

Turkey trapping operations were conducted on 2 WMAs and one private tract. A total of 85 birds were caught and transported to release sites.

Nuisance animal complaints, including coyote, beaver, alligator, and deer, were received and handled by this office. Employees cooperated with individual landowners in an effort to relieve problems and point out management practices which would minimize damages.

Environmental assessments were made of various federal, state, and parish projects proposed for the district. Meetings were attended relative to these projects and, when applicable, recommendations were made. Fish and wildlife losses were determined with appropriate mitigation measures being outlined in the recommended plan.

Deer range surveys were conducted district-wide. These investigations lead to a better understanding of deer herds and their relationship to the various range capabilities. Deer seasons and harvest recommendations are based on these surveys.

District personnel assisted in the Department's land acquisition program. Our duties involved attending meetings, habitat evaluations, and making recommendations for the acquisition of 2 tracts. These tracts, located in Concordia and Tensas Parishes, are for the potential establishment of a WMA. These lands will be used primarily for wildlife management and to provide for public outdoor recreation.

Catahoula Lake management involved water-level control for food plant production, maximum waterfowl numbers, minimum lead poisoning losses, and optimum fisheries. A 1,100 acre resting area and mudboat operation boundary was posted and enforced by district personnel. The lake was regularly patrolled and all state and federal regulations enforced. Waterfowl bag checks were conducted during the regular waterfowl season and revealed that hunter participation was down, with 2.7 birds bagged per effort. Lead shot studies continued with the collection of duck gizzards and soil samples.

Assistance was given to the U. S. Fish and Wildlife Service with the Lower Mississippi Valley Mallard Study through aerial transect survey. Personnel also participated in the steering committees for Joint Venture of the North American Waterfowl Plan.

District IV is very popular with the state's sportsmen and a large number of man-days is expended each year, which adds greatly to the local economy.

District V

District V is comprised of eight parishes in the southwestern portion of the state. These parishes are: Acadia, Allen, Beauregard, Calcasieu, Cameron, Evangeline, Jefferson Davis, and Vermilion. The District V headquarters and office complex is located in Lake Charles .

The wildlife habitat that occurs across the district is extremely diverse, ranging from extensive coastal marshes to hardwood river and creek bottoms to pure pine plantations. Due to this diversity, a variety of recreational hunting opportunities are available to sportsmen. A large portion of the northern part of the district is open to the public for recreational use, but over the last year several private hunting club leases have appeared. The habitat has remained somewhat stable over much of the district. Timber companies continue to harvest timber in a clear-cutting method and replant these areas to pure pine plantation.

Crop damage by wildlife occurred at a normal rate across the district. Complaints consisted of geese and ducks feeding in rice fields, deer feeding in soybeans, and numerous complaints of coyote, raccoon, nutria, and alligator problems. District personnel gave assistance and/or advice in resolving problems.

Sportsmen enjoyed success in all types of hunting available throughout the district. Normal complaints were received concerning various matters, including hunting dates, either-sex deer seasons, and steel shot versus lead shot.

District V enrolled 55 deer hunting clubs comprising 134,715 acres into the Deer Management Assistance Program and issued 581 antlerless tags. Fair success was reported with over 50% of the tags used.

District V issued 427 alligators tags during the 1988 alligator season along with 35 commercial licenses, 6 resident sport licenses, and 27 non-resident sport licenses.

Turkey and pheasant stocking and surveying projects were continued. Both populations seem to be increasing and spreading out from release sites.

Other activities which occurred within the district included the inspection of property for Department purchase, scent-post surveys, Canada goose surveys, posting of mini-refuge properties, assisting in enforcement operations during waterfowl hunting season, and giving assistance or lectures to civic groups, schools, and hunting clubs. District V personnel also assisted the public on commercial and recreational licenses, boat registration, rules and regulations, and season dates for hunting, fishing, shrimping, and oystering.

District VI

Repairs and maintenance were conducted where needed on all WMA physical structures, roads, bridges, boundaries, camping areas, and range facilities.

Timber contracts were executed; cut boundaries and leave-trees were marked on approximately 370 acres of bottomland hardwoods.

A farming agreement was negotiated on U. S. Fish and Wildlife Service lands (Atchafalaya National Wildlife Refuge) to leave grain in the field for wildlife, for winter food plantings, and for waterfowl trapping and banding.

An estimated 127,000 recreational man-days were monitored on 92, 000 acres of WMA lands. Approximately 4,200 public user's interviews were conducted.

Research conducted by Louisiana State University and University of Southwestern Louisiana was coordinated and monitored on Thistlethwaite.

A mourning dove Call-Count Survey was run on 27 May 1988. This survey consisted of two 20-mile established routes, one in Jefferson Davis Parish, the other in St. Landry and Evangeline Parishes. The 1988 survey count was slightly down from the 1987 survey.

Turkey check stations were established throughout the district in 1988. Thirteen check stations were set up in 5 parishes. Twenty-six turkeys were weighed in St. Landry, 27 in Pointe Coupee, 89 in West Baton Rouge, 32 in Iberville, and 8 in St. Martin, for a total of 182 turkeys weighed in the district; 155 (85%) of these were adults, with 27 (15%) being juveniles. This represents one turkey harvested for every 550 acres. The restocking of turkey in the district is an ongoing project.

Ninety-six cooperators were enrolled in the 1988-89 Deer Management Assistance Program, with 211,060 acres covering 7 parishes. The recommended antlerless kill was 1,559. Of this figure, 1,094 were harvested, 30% less than recommended. The number of cooperators has increased by 13 since the 1987-88 season. Deer harvest on District VI wildlife management areas was estimated to be 750, or one deer per 125 acres.

Squirrel season was rated as good on all WMAs and good throughout most of the district.

Regular waterfowl season was rated as fair. The estimated harvest was about 30-35% of recent annual harvests due to modifications and restrictions on dates, time, and bag limits.

Wood duck nesting activities continue to thrive throughout the district. There are 420 artificial nesting structures on 6 WMAs, the ANWR, and on Indigo Island. Some areas continue to have as much as 150% usage. More boxes are scheduled to be erected in these areas of high use. Approximately 4,000 ducklings were hatched last nesting season. The number of hens banded continues to be about 100 per year.

A Canada goose survey was conducted in Vermilion Parish. The survey line is approximately 60 miles long. An increase in the number of Canada geese was recorded by this year's survey. White-fronted and snow goose populations have also increased.

A fur animal census was conducted by district personnel on three 50-mile census lines. Scent-post stations are placed one mile apart on the line. Opossum, skunk, and raccoon account for the majority of visits. On the 1988 census, bobcat visits were observed on 4 occasions. Bobcat visits were down from 11 in 1987 but opossum, skunk, and raccoon visits have increased slightly.

An increase was seen in the number of alligator tags issued and hunters for the 1988 season. Five hundred twenty-eight tags were issued to 39 hunters, with a harvest of 474 alligators (90% hunter success). Hunts were conducted on 185,982 acres, an average of 352 acres per tag. In 1987, 101,790 acres were hunted, averaging 346 acres per tag. The increase in hunters and tags issued could probably be correlated to the increase in price per foot. Thirty nuisance tags were issued to 2 nuisance hunters.

Mast production surveys were conducted on all WMAs in the district. Several mast-producing species were checked on each area. The mast crop of 1988 on the average was slightly lower than the 1987 crop.

Acorn collection, tree planting, tree releasing, and site preparation are presently in progress.

District VII

Personnel trapped 63 turkeys during the early months of 1988, moving 50 of them to new locations and releasing the rest for study purposes. During the turkey season, 857 gobblers were checked-in by hunters at voluntary weigh stations throughout the district. These birds represent 57% of the total statewide recorded harvest.

Spring and summer plantings were made on Ben's Creek and Pearl River WMAs. Primary emphasis of these plots is to improve the turkey habitat by providing feeding areas for hens and poults. Chufa was planted on the turkey trapping sites in East and West Feliciana.

District personnel checked hunters during the various seasons on wildlife management areas. Almost 3,000 deer hunter efforts were recorded during the gun season on WMAs. Bag checks of duck hunters received special emphasis. Manchac hunters produced the best results and averaged 1.3 ducks per hunting effort.

Timber work on Pearl River WMA continued. Personnel met with researchers from North Carolina State University to exchange ideas concerning timber management in swamp habitat. A 90 acre experimental strip cutting unit was marked and cutting is to begin in early 1989.

District personnel continued to work with hunting clubs and landowners in the Department's Deer Management Assistance Program. During the 1987/88 season, 124 cooperators harvested 1,012 bucks and 978 antlerless deer. Data obtained from these deer were used to make management decisions and harvest recommendations for the 1988/89 season.

Upland Game Section

Quail

Two population surveys were conducted this past year: the wing survey and the fall whistling survey. Hunters participating in the annual wing survey supplied 426 wings. From these wings, sex and age ratios were determined. Statewide fall whistling counts were conducted on 50 randomly located routes. Inferences about population conditions were developed based on the combined results of these 2 survey techniques and general observations made by department personnel during the breeding season.

The bobwhite disease investigation was continued in 1988. Necropsy and pathology analyses of birds submitted to the Louisiana Veterinary Medical Diagnostic Laboratory at LSU revealed no significant diseases or parasites.

The Louisiana Tech study evaluating wildlife utilization of plantings versus fallow discing was completed in 1988 on National Forest lands with section personnel performing most of the field data collection. In addition, the four-part research project on bobwhite habitat management initiated by section personnel in the summer of 1986 continued as did the Southeastern/Louisiana State University cooperative study on LDWF lands. Results of these studies should provide valuable information concerning practical management of pinelands for bobwhite in Louisiana.

Pheasant and Black Francolin

During the winter of 1988, bait sites were established for pheasant trapping purposes. Although feeders were run on these sites through mid-March, appreciable use of the sites by pheasants was not observed. The night-lighting pheasant capture technique was also attempted in the spring of 1988. However, wet conditions of the fields restricted vehicular use to ATVs. Consequently, only limited areas were searched. The night-lighting technique will continue to be examined.

Spring cock pheasant crowing counts were conducted on the Lake Arthur and Sulphur area sites. The Lake Arthur count remained very low. The Sulphur route's counts were 33% below the 1987 values but remained above the 4-year average for the site. Pheasants were also observed in a number of new areas.

Spring call counts of Black Francolin were conducted along one route in lower Calcasieu Parish. The Black Francolin, a non-native game bird, was last introduced into the area during the late 1960's and a small remnant population remains.

Woodcock

The statewide investigation to address the reproductive condition (i.e., follicle and testis size) of woodcock during the hunting season continued. Data were obtained from over 100 woodcock collected by department personnel and volunteers during the 1987-88 hunting season.

Acres for Wildlife

Some 248 cooperators (which included over 50 hunting clubs with large memberships) with lands totalling more than 200,000 acres were enrolled in the "Acres for Wildlife" program in 1988. Program biologists inspected land, prepared management plans and bulletins, and made presentations to various groups.

Upland Development

Upland game development work continued on WMAs during 1988. Food plots totalling almost 1,000 acres were planted by section and district personnel. An additional 10,000+ acres were bushhogged, disced, or control burned by department personnel.

Farm Bill Activities

Department personnel worked extensively on Farm Bill activities during 1988. Work included promoting the Conservation Reserve Program (CRP), providing support for expansion of the CRP to allow enrollment of farmed wetlands, and evaluation of Farmers Home Administration (FmHA) inventory properties for bottomland hardwood and wetland enhancement potentials. Fee title transfers of 58 properties were pursued, easement managerships of 6 properties were assumed, and a cooperative agreement between the U.S. Fish and Wildlife Service (Service) and the Department for the management of easements administered by the Service was developed.

Fur and Refuge Division

The activities of the Fur and Refuge Division can be divided into four major categories: managing land which the Department owns or leases; research into new and improved management practices for the State's fur, alligator and other wildlife resources; direct land management and supervision of the State's fur and alligator resources.

Land Management

The Fur and Refuge Division is responsible for the management, improvement, and protection of five refuges and four wildlife management areas. With the exception of Coulee Wildlife Refuge, all of the areas are in the coastal marsh zone of South Louisiana. Refuges comprise 177,000 acres and wildlife management areas comprise 251,000 acres.

Management practices employed on the refuges and wildlife management areas are primarily directed toward improving wetlands for resident and migratory waterfowl. The multiple-use management concept is used wherever feasible, so that many other aquatic based animals, including furbearers, fish and resident game and nongame birds, also benefit.

Public demand for recreational use of refuges and wildlife management areas continues to increase. Sport fishing, crabbing, and nature study are very popular activities on wildlife management areas.

An extensive law enforcement program is carried out on all Fur and Refuge Division managed property. Mineral activities on all the areas are closely monitored. Each activity is individually reviewed and must comply with the Department's mineral regulations, Deeds of Donations and various agreement letters.

Rockefeller Refuge

The state-owned Rockefeller Refuge, located in Cameron and Vermilion Parishes, comprises some 85,000 acres of prime coastal marshland. Impoundments varying in size from 480 to 5,680 acres have been constructed on the refuge to house the over 300, 000 waterfowl that spend the winter on the area each year. Year-round residents include nutria, muskrat, raccoon, otter, mink, deer and alligator. Rockefeller Refuge also provides excellent habitat for a diverse and abundant group of wading birds.

Capital Outlay Project No. 16-02-00-84-3 was completed in early 1988. This project entailed the rebuilding of forty-five miles of levees which maintain the integrity of the waterfowl impoundment system on Rockefeller Refuge. This major project will insure adequate levee elevations against all but the most catastrophic of tidal conditions. Also completed was Project No. 16-02-00-85-1, the restoration and enlargement of the office, restoration of the general quarters dormitory and two residences. Energy efficiency and low maintenance were the main objectives of this project. The restoration of all buildings at the headquarters complex presents an excellent perspective of the Department of Wildlife and Fisheries to the public and the many distinguished guests that come to work or observe the refuge research and management programs.

Mobil Oil Company recently released the lower portion of their mineral lease on Rockefeller Refuge. Meeting with the environmental section of Mobil Oil and the technical staff of Rockefeller Refuge, plans were formulated to restore these areas to natural conditions. Work began by removing a 24" abandoned production line. Several dead end location canals were plugged with earthen dams and capped with reef shell. All abandoned production facilities were removed and all flow lines dug up, removed, and the ditches backfilled. Mobil Oil has further agreed to maintain these structures as long as their mineral lease remains active on the Refuge.

The construction of a new airstrip on Rockefeller Refuge was begun with mitigation work performed by Pennzoil Oil and Gas Company. A major access canal used by this company was dredged and the spoil deposited according to the recommendations from the technical staff on Rockefeller Refuge. Later, Fur and Refuge Division draglines were assigned the task of leveling the spoil in order that conventional equipment (tractors and road graders) could work this material into a flat road bed. Rye grass and coastal Bermuda were planted to prevent erosion. This strip, when completed, will be approximately 4000' long and approximately 100' wide.

Work was completed on a 5-barrel water control structure in Cop-Cop Bayou. All work was completed by Department personnel. with the addition of this structure, the entire marsh complex to the north of this drainage system has been brought under salinity control .

The East End Locks, the largest water control structure on the Refuge, received minor repairs during the past year. The ram which operates the south gate was replaced. Further inspection indicated this structure was in immediate need of major repairs. with the assistance of personnel from DOTD, drawings and estimated cost figures were submitted as a capital outlay project. This project has been approved and work should begin when the administration grants approval.

Public recreational use of Rockefeller Refuge has greatly intensified in the last year resulting in additional work responsibilities for the staff. Aspects of refuge management which were especially impacted included boat launch facility maintenance, water control structure maintenance, road upkeep, information and education services, facility beautification work, and enforcement efforts.

Marsh Island Wildlife Refuge

Marsh Island Wildlife Refuge is located in the center of Louisiana's Gulf Coastal marshes. The island is comprised of primarily brackish marshes vegetated predominantly by wiregrass (*Spartina patens*), three-cornered grass (*Scirpus olneyi*, black rush (*Juncus roemerianus*), hog cane (*Spartina cynosuroides*), saltgrass (*Distichlis spicata*), leafy three-square (*Scirpus robustus*) and feather grass, (*Panicum virgatum*). Marsh Island supports a wealth of resident wildlife species and provides wintering habitat for thousands of migratory waterfowl, geese and shorebirds.

Management of Marsh Island as a wildlife refuge is a formidable task for the Department. In addition to the marsh management activities, maintenance of the headquarters facilities and associated equipment, boats and motors, impoundment water control structures and many fixed crest weirs provides ample work opportunities for the entire staff.

During 1988, two equipment purchases were made that will be of major importance in management and daily operation of Marsh Island. A 36-foot Crewboat (" M.O. Sage") was completed and launched in October, 1988. It is equipped with modern navigational equipment (radar and Loran c) , digital depth recorder and communication equipment. It is used to transport personnel, equipment, fuel, and in enforcement and rescue work. Additional fuel tanks were installed to ferry gasoline and diesel to the island to supply fuel to the generators and other engines.

A 14-foot Stossel airboat was also purchased in August, 1988 for Marsh Island. This boat is used for various activities including environmental monitoring (collecting salinity and water level data) , vegetative inventories, research projects, marsh burning and routine patrols. This boat provides an important mode of transportation especially during periods of low tide.

A fuel dock was constructed at the headquarters facility. Three tanks (560 gallon diesel, 260 gallon aviation fuel, and 260 gallon gasoline) were elevated on a platform, with dock space built under the tanks. These fuel tanks allow for bulk storage of fuel and a safer, more efficient method of transporting, unloading, storing and dispersing fuel into various types of equipment. During 1989, routine maintenance will be conducted on the headquarters facility, water control structures and all equipment. Plans are being developed to construct a storage facility for the new airboat.

Environmental monitoring on Marsh Island includes determining weekly water salinities (39 sites) and water levels (12 gauges) and daily temperature and rainfall amounts. A constant tide recorder graphically records water levels within a weired management unit on Marsh Island. This recorder was installed in June 1988 and will provide data on the effect of a fixed crest weir on marsh water levels.

A full-time biologist was recently assigned to Marsh Island Refuge. The biologist will be responsible for initiating and conducting needed research and monitoring projects on Marsh Island to insure the Department's compliance with the Deed of Donation. During 1988 both impoundment units were drained in the Spring to promote annual grass germination and production. The impoundment is still plagued by high soil salinities from the storm surge associated with Hurricane Danny in 1985. The current management scheme allowing rainfall to flood ponds and then dewatering those ponds in order to leach the salt out of the pond substrate is working. The water control structures were closed in August to begin pooling water for the fall waterfowl flights. Aerial surveys indicated high waterfowl concentrations in the impoundments in September, October and early November. However, a rare winter time drought beginning in mid-November, virtually eliminated all water from ponds during December and significantly reduced waterfowl usage. High salinities in the outside water system did not allow the staff to use this water source to replenish the impoundment ponds. Rainfall has increased in early January 1989 and recent surveys have indicated increased waterfowl usage.

The annual trapping program on Marsh Island during the 1987-88 season resulted in a harvest of 9,787 nutria, 3,607 muskrats, 195 raccoons, 24 mink and 5 otter. Due to extremely poor pelt prices for both nutria and muskrat, it was difficult to achieve a sufficient trapping effort necessary to harvest these prolific furbearers. Excessive numbers of nutria and muskrat resulted in overutilization and marsh damage during February and March 1988. Fortunately, the damaged marsh recovered during the summer and fall of 1988. The Fur & Refuge Division is conducting marketing research in an attempt to stabilize pelt prices. Control of these furbearers by trapping is an absolute essential part of any marsh management program. A good pelt price is the key to achieving an adequate effort to obtain a sufficient harvest.

The value of present marsh management techniques remains controversial and these are presently being questioned. These management techniques (water control structures, burning, etc.) have been implemented in the past and are presently being used on many refuges in Louisiana including Marsh Island Wildlife Refuge. Therefore it is important that results of these management techniques on Marsh Island be documented.

The continual effort to improve Marsh Island includes promoting the growth of desirable vegetation necessary to support ducks and geese while benefiting other wildlife species. On Marsh Island this has been and is presently being done by the use of water control structures and burning.

Burning the marsh in late fall and winter is necessary to prevent plant succession in brackish marsh. If not burned, brackish marsh will be dominated by wiregrass, a plant with limited wildlife value. Burning allows grasses to germinate, and it gives three-cornered grass an early start during the growing season. Three-cornered grass is a prime food for many wildlife species such as snow geese and muskrat. Burning on Marsh Island began in late September and will continue through the winter.

Presently, a study is being conducted to (1) determine the distribution and abundance of wintering waterfowl on Marsh Island and (2) to relate the abundance and distribution of waterfowl to management units (weired, unweired or impounded marsh), marsh burning and vegetation types.

Aerial surveys are currently being used to estimate wintering waterfowl on Marsh Island. Department aircraft are being used to conduct these surveys which began in October and will continue through February. Waterfowl distribution is being determined by aerial transects flown at one mile intervals, at approximately 90 mph and 150 feet in altitude. The total width of the transect is 1/4 mile. Numbers of waterfowl, by species, observed from both sides of the aircraft are estimated and recorded. Habitat information (management unit, water level, etc.) is recorded by the navigator. Total counts of waterfowl are being conducted for the impoundments on Marsh Island. Vegetation (type and density) in the management units (weired, unweired, and impounded) has been determined and will be checked periodically. Estimated water depth in ponds is also recorded. These results will allow for comparison of waterfowl usage based on aquatic vegetation density, water levels, and management types.

Various Fur Research and Management Section research projects are conducted on Marsh Island Wildlife Refuge with the assistance of refuge personnel. These projects are reported in the research section of this report. Project titles are:

1) Analysis of Marsh Management Techniques — Effects of Weirs on Marsh Island.
2) Marsh Island Wildlife Refuge Experimental Alligator Research Project.
3) An Experimental Reintroduction of Nutria and Subsequent Assessment of Changes in Population Parameters.
4) Evaluation of the #2 Longspring Trap and the Fox Soft-Catch Trap for Efficiency in Capturing Nutria.

All Refuge rules and regulations and those regulations pertaining to Vermilion and Cote Blanche Bay, and near offshore waters were enforced by Refuge personnel. Examples of specific cases include illegal use of crab traps and gill nets, shrimping out of season, harvesting undersize crabs and over-the-limit on cast netting for shrimp.

Marsh Island Wildlife Refuge is a tremendous asset to the Department and to the people of the state. Thousands of man days of recreation are spent fishing, crabbing, sight seeing and cast netting for shrimp annually. Marsh Island provides a unique setting and a natural resource base that makes it an ideal study area for waterfowl, alligator, furbearer and marsh management research.

State Wildlife Refuge

State Wildlife Refuge contains 13,000 acres of brackish marsh habitat and is located on the western shore of Vermilion Bay. Habitat management of this refuge is directed toward providing wintering habitat for ducks and geese. State Wildlife annually winters in excess of 100,000 snow geese and thousands of ducks.

During 1988, routine maintenance was conducted on the refuge headquarters facility, the grounds and all assigned equipment. The headquarters, boatshed and shop were cleaned and painted. Preventive maintenance was performed on all boats, motors and water control structures. During the spring and summer months the entire boundary of the refuge was posted to guard against illegal entry.

During March, 1988 an extensive ditch system was planned and initiated. The ditch system was designed to connect various portions of the Refuge and to provide for access to remote interior marshes of the Refuge. Various water sheds which are controlled by fixed crest weirs were connected. Refuge personnel can now travel with a small flat throughout the interior of the refuge for management and enforcement activities. Regulated marsh burning and monitoring of various wildlife populations can easily be conducted now that access is provided. Management and harvest of furbearers will be enhanced due to easy access into the marsh by trappers. This ditching process was completed in September.

Marsh management practices utilized during 1988 included the annual marsh burning to promote three-corner grass production, general maintenance to existing water control structures and harvesting of abundant furbearers. During the fall of 1987 it became evident that muskrat populations on the refuge were expanding rapidly and extensive trapping efforts would be required to control these populations during the 1987-88 season. Approximately 20 trappers harvested 33, 369 muskrats and 2,223 nutria during the annual trapping season. This extensive trapping effort resulted in a tremendous harvest of furbearers, however substantial marsh damage occurred from the remaining excessive numbers of muskrat in spite of our best efforts.

Concentrations of snow geese in January and February of 1987 caused extensive marsh damage on some areas of State Wildlife Refuge. During the fall and winter of 1987-88 high concentrations of snow geese were once again wintering on the refuge. Refuge personnel attempted to redistribute these geese from one area to another by marsh burning and were somewhat successful, thereby helping to minimize habitat damage. The selective feeding habitats of muskrat and snow geese during the winter effectively eliminated most stands of three-cornered grass. with the reduction of this preferred plant species, virtually no snow geese overwintered on the refuge during 1988-89.

During 1988 substantial recreational use of State Wildlife Refuge occurred for both sport fishing and sport shrimping. Along with these recreational activities, substantial time was spent enforcing the various rules and regulations. Fur and Refuge Division personnel once again provided invaluable assistance to local enforcement agents in patrolling and enforcing commercial fishing and shrimping laws. The patrol boat (Mr. McIlhenny) was used extensively to assist Enforcement Division personnel in patrolling Vermilion Bay and near offshore waters. Special emphasis was placed on enforcing shrimp and oyster rules and regulations and refuge personnel provided lodging and law enforcement assistance beyond their regular routine to accomplish this mission. The patrol boat was frequently used to assist the Vermilion Parish Sheriff's Department in search and rescue operations. Large numbers of sport and commercial fishermen were provided assistance when they experienced equipment failure. Several special operations were conducted in cooperation with US Customs Blue Lighting Task Force in patrolling Vermillion Bay and nearby waters.

Atchafalaya Delta Wildlife Management Area

The Atchafalaya Delta Wildlife Management Area consists of approximately 137,000 acres of shallow water bays and marshes. Nearly 13,500 acres of the emerging delta have been colonized by vegetative communities. Extensive areas lie just beneath the water's surface, are exposed during periods of low tide and will become vegetated in the near future.

In order to facilitate operating such an extensive WMA, maintenance of the headquarters facilities and associated equipment is of major importance. In addition to washing the headquarters building, routine daily maintenance was conducted on the headquarters's generator buildings, Wax Lake patrol camp, storage area and preventive maintenance performed on all boats and motors. The patrol boat "Atchafalaya" was completely repainted and the bottom repaired. A top with lights was added to the rear deck to help with night patrolling to enforce inshore/offshore shrimp regulations.

Along with the routine maintenance, other projects were completed on the WMA which included construction of a fuel dock, driving of channel marker pilings, installation of a tide recorder, reconditioning of camp bulkhead, dredging of access canals, repairs to levees and water control structures and drilling of a water well.

Recreational opportunities abound for the public on Atchafalaya Delta Wildlife Management Area. Activities include waterfowl and rabbit hunting, sport fishing, camping and bird watching. During 1988, improvements were made to the camping areas at the Main Delta and Wax Lake Outlet. These improvements included land leveling, grass planting and construction of tables and mooring sites. These camping areas are used frequently during the waterfowl and rabbit seasons and are receiving increased utilization from commercial fishermen.

Three outbreaks of avian botulism Type C occurred during 1988 on ADWMA. The outbreaks occurred at the Main Delta area in July, August and October. Department personnel employed the following procedures to halt the outbreaks:

1) Daily collection by airboat of all sick and dead birds. Dead birds were incinerated and buried; sick birds were caged, and fed until healthy enough to be released.
2) Continuous harassment of birds attempting to fly into the affected areas prevented additional infections. Harassment was accomplished utilizing airboats and strategic placement of carbide guns.

Approximately 100 dead carcasses were collected and burned as a result of the outbreaks. The primary species affected were ibis, snowy egrets and mottled ducks. The control efforts were successful and the outbreaks of botulism were stopped.

Although an extremely large number of waterfowl were present on the wildlife management area during the fall and winter of 1988, hunter effort was drastically reduced by approximately 50% from 1987. More restrictive bag limits and the change in shooting hours may have been responsible for this decrease. The most common species harvested included teal, pintails, mallards, gadwalls, mottled ducks and widgeon. An increase in sightings of Canada geese, snow geese and bald eagles was noted in 1988. Rabbit hunters were also successful during 1988.

Plans to construct two small semi-impoundments to provide habitat diversity for waterfowl were prepared. One impoundment was completed; however, high water subsequently damaged a portion of the levee and a flapgated pipe will be required to accomplish successful water control. Repairs were made to levees after damage from a hurricane. The objective of the management plan is to achieve spring drawdowns for annual grass production and to hold water during periods of low tides during the winter months.

A substantial amount of manpower was required for enforcement activities associated with the Atchafalaya Delta Wildlife Management Area and its surrounding waters. In addition to enforcing specific rules and regulations on the WMA, Division personnel assisted in enforcement of commercial shrimping, fishing and oystering rules and regulations. The patrol boat "Atchafalaya" was used extensively during the spring and summer to enforce the inside closure of shrimp seasons. Airboats from the management area assisted local enforcement agents in locating baited waterfowl ponds in surrounding marshlands. These enforcement agents assisted our personnel during the opening weekends of waterfowl season to enforce hunting regulations. The boat "Atchafalaya" was also used to ferry individuals on field trips to ADWMA, Marsh Island Refuge and State Wildlife Refuge.

Pass-A-Loutre Wildlife Management Area

The Pass-A-Loutre Wildlife Management Area is composed of 66, 000 acres of marshland located at the mouth of the Mississippi River in Plaquemines Parish. The area is extremely productive for waterfowl due to its location at the terminus of the flyway system and production of choice waterfowl food. The entire delta system in which the management area is located has been experiencing significant marsh loss. Due to the extreme marsh loss rates that are occurring in the Mississippi River system, several innovative marsh creation projects have been underway on the management area.

One such project utilizes man-made canals to direct sediment into subsided bay systems. The project shows potential for creating marsh within these open water areas. The project was submitted by the Department in 1983 to the Governor's Coastal Erosion Task Force which confirmed the project and allocated approximately one half-million dollars for construction and scientific study. Construction of the project was completed in the summer of 1986 and researchers are now documenting the effectiveness of the silt diversion canals. The canals vary in width from 150 feet to 400 feet and island formation was observed after the spring floods of 1987 and 1988. It should also be noted that the 1988 Mississippi River stage was the lowest record in recent history which significantly reduced land building capabilities on the silt diversion sites. It is anticipated that the South Pass site should form areas of vegetative wetlands after the spring floods of 1989. Six additional silt diversion sites are presently permitted and the Department will direct mitigation efforts toward these sites.

A second study presently underway has also shown promise in the area of marsh creation. This study utilizes synthetic materials to capture sediments which may ultimately be transported into the Gulf and lost to the natural delta building processes. A pilot project was completed in 1983; an expanded study was initiated in February, 1984 . Results of the study indicate that sediment fencing has potential for creating marsh in overflow delta systems. Observations in the summer of 1987 revealed that open bay systems were converted to vegetated marsh. Expansion of the concept to the Atchafalaya Delta is anticipated. The fencing concept is presently being expanded to Salvador Wildlife Management Area to investigate its feasibility as a method of erosion control for oil field access canals.

Water quality stations were monitored throughout 1988 at two week intervals. Water quality data indicated that the interior wetlands were subjected abnormally high salinities throughout much of the year due to extremely low river stages. This resulted in an estimated 90% reduction in an important waterfowl food plant (delta duck potato) and a reduction in other fresh water plant species on the area.

A fourth year of an experimental archery season was conducted in 1988. A total of 28 deer were harvested with 368 hunter efforts for a hunter success of one deer per 13 hunter efforts. This is considered an excellent success ratio for a deer archery season.

Employees at the facility issued approximately 700 citations during the fiscal year; accounting for a significant portion of citations issued in the southeastern portion of the state. The majority of the citations were issued outside the boundaries of Pass-A-Loutre Wildlife Management Area.

A U.S. Fish and Wildlife Service canvasback study on food habits and body conditions was completed in 1988 and a telemetry study was initiated. Division personnel provided invaluable assistance to the USFWS to insure the success of this project. Valuable information is expected to be obtained from this series of research projects on this important migratory species.

Salvador Wildlife Management Area

The Salvador Wildlife Management Area is located along the northwestern shore of Lake Salvador in St. Charles Parish. The area is comprised of approximately 30,000 acres of fresh and intermediate marsh which produces ideal habitat for waterfowl and alligators. A sizeable deer herd is present on the area due to habitat diversity consisting of wax myrtle thickets, access canal levees and natural ridges.

A fourth experimental either sex deer harvest was conducted during 1988 for a period of three days. A total of 104 deer were harvested with 912 hunter efforts for a calculated success ratio of one deer per nine hunter efforts. As in years past this is considered to be an excellent success ratio. Data obtained from the managed hunt will be utilized in conjunction with other information for management decisions for the upcoming 1989 season.

A pilot project utilizing the sediment fencing concept was constructed in 1988. The project will investigate the potential use of sediment fences in stabilizing oil field canal bank erosion. The project is being conducted in cooperation with the La. Geological Survey. Approximately one mile of fencing materials have been constructed and will be monitored throughout 1989.

A second research project was initiated in cooperation with La. State University during 1988. The objective of the project is to determine water movement into flotant marshes and non-flotant marshes. This will provide valuable information for future management of the Salvador Wildlife Management Area.

The third year of an experimental alligator harvest program was completed during 1988. A total of 945 alligators were harvested with the average size taken being approximately 6.0 feet. The experimental harvest is part of an ongoing program designed to fill information voids and determine the effects of harvesting above the present quotas.

During 1986, the Corps of Engineers in conjunction with the U.S. Fish and Wildlife Service and the Department reviewed the Salvador WMA for potential management sites for mitigation associated with a segment of the westbank hurricane protection levee. During 1987 Congress authorized mitigation for a segment of the westbank hurricane protection levee. The mitigation package included acquiring properties in excess of 1000 acres and authorization of one or more water control structures. The Department is expecting a final approval during 1989.

The Corps of Engineers initiated survey operations on the Davis Pond Fresh Water Diversion Project located in the northern portion of the management area during 1988. Survey work should be completed during 1989.

Pointe-au-Chien Wildlife Management Area

The Pointe-au-Chien Wildlife Management Area is comprised of approximately 30,000 acres of marshland. Marsh types vary from nearly fresh to brackish. The area provides habitat for waterfowl but is gradually changing to a more saline environment which is more conducive to marine organisms. In addition to increased salinities, the area has experienced extreme marsh loss rates in recent years. Factors which have influenced this deterioration trend include saltwater intrusion, canalization, reduction in fresh water and sediment influx, subsidence, extreme tidal fluctuation, erosion, and a rise in sea level. The following projects have been proposed to offset this significant marsh deterioration process:

The Montegut Project has placed approximately 3,500 acres of wetland under management. The project site is located southeast of Montegut between two natural ridge systems formed by Bayou Terrebonne and Bayou St. Jean Charles. Approximately 4.5 miles of levee and two (2) fixed crest weirs will place this wetland system under management and ultimately enhance wildlife and fishery resources of the area. During 1983 the project was proposed to the Governor's Coastal Erosion Task Force. In mid-1986 the project was let for bids, All bids received were above the proposed funding level. The project was rebid and construction initiated during the latter part of 1987. The project was completed in 1988. Anticipated benefits include marsh stabilization, increased recreational fishing and enhancement of waterfowl habitat.

The Grand Bayou Project encompasses approximately 4,500 acres of wetland located immediately west of Grand Bayou and Cutoff Canal. Similar to the Montegut Project, the area has experienced significant wetland loss. The project proposes establishing approximately seven miles of levee system with three fixed crest weir structures. The U.S. Fish and Wildlife Service in coordination with our Department has submitted the project to the Corps of Engineers as potential mitigation for the Larose to Golden Meadow Hurricane Protection Levee. A conditional approval was granted by the Corps of Engineers during the latter part of 1986. During 1987, National Marine Fisheries Service requested that the Corps of Engineers consider constructing slotted weirs in place of the traditional fixed crest weirs. In 1988, the Department requested that water control structures be utilized in place of slotted weirs to add increased management flexibility for revegetation potential. The Corps of Engineers is presently addressing the feasibility of incorporating this proposal into the original plan.

The Bully Camp management unit is located west of the Bully Camp Oil and Gas Field and is bordered entirely by petroleum access canals. The area encompasses approximately 1000 acres. Hurricane Juan in 1985 damaged a large portion of the levee system of this unit. FEMA supplied funds to rebuild the levee system which was completed during mid-1987. During the latter part of 1988 two mitigation projects were proposed for this management unit. The projects require construction of two earthen plugs, and it is anticipated that plugs will be completed during 1989. The remainder of the projects (one plug and one water control structure) to complete this management unit will be performed as mitigation funds or Department funds become available.

Water quality stations have also been set up throughout the Pointe-au-Chien area. Salinity stations were maintained throughout 1988 and data is presently being utilized in the formulation of management plans for the area.

An erosion control project was initiated during 1988 utilizing the sediment fencing concept along an interior oil field canal. Vegetative plantings were utilized in conjunction with the fencing material to reduce erosion on the southern perimeter levee of the Bully Camp management unit. The project is being conducted in cooperation with the La. Geological Survey and will be monitored throughout 1989 to determine its effectiveness.

Maintenance Section

The maintenance section of the Fur and Refuge Division is charged with the responsibility of upgrading and maintaining the remote facilities and grounds on four wildlife management areas and five refuges administered by the Fur and Refuge Division, all except one being located in coastal Louisiana.

Because of a critical water well at Rockefeller beginning to sand in and creating water problems at the alligator incubation tanks and the fisheries laboratory, a 4" water line was installed from the municipal water line approximately 3500 ft. to the incubator and laboratory area. The maintenance section also constructed two additional incubators because of the increased demand being placed on the existing structures. While working on the incubators, several of the heavy double insulated doors were replaced with new shop built doors to facilitate easier opening.

The maintenance section removed three deteriorated storage buildings and replaced them with a new three section storage shed with loading ramps to be used for storing feeds, seeds, fertilizer and confiscated goods. While working at Rockefeller, all out-buildings, pump sheds, and boat houses were repaired, siding and roofing replaced where needed, and all were repainted.

At the New Iberia Office, a fur research program was initiated to study the feasibility of farm raising of nutria. The maintenance section began constructing a large concrete bottomed set of pens to house the nutria. Originally it was to be built to facilitate ease of watering, feeding and cleaning and to be protected with an insulated roof. However, due to budget cuts, this program was put on hold and the construction only reached the stage of the concrete floor covered with the tin roof.

The maintenance section completed the year at St. Tammany Refuge, posting signs around the boundaries and burning the marsh to encourage the growth of the more desirable three corner grasses. On State Wildlife Refuge during this time the heavy equipment operators were cleaning many miles of trapping ditches connecting various isolated areas to provide access for trappers, enforcement, and research personnel to these areas.

Research

The Fur and Refuge Division's research program is managed by two biologists stationed in North Louisiana, eight biologists in coastal Louisiana, and a number of nontechnical support personnel. Programs of research responsibility include statewide alligator research and harvest, statewide fur research and management, research directed toward marsh enhancement, marsh ecological monitoring, alligator farm research, statewide alligator farm extension service, Canada geese propagation and monitoring, brown pelican and bald eagle conservation programs, estuarine fisheries research, pond culture studies and, very importantly, research directed towards conservation of Division managed property. The dissemination of information was an important function of the Fur and Refuge Division during the past year. Scientific information was distributed in the form of lectures to visiting school/university groups, technical writings, symposia presentations, in-service training programs, landowner/farmer extension, department movies, magazine articles, and through the news media. Professional expertise was provided for the implementation of international, federal and state legislation/regulations governing the wise use of alligators and furbearers.

The technical staff of Rockefeller Refuge is deeply involved with the implementation of marsh management plans; not only on Fur and Refuge Division properties but also on private lands.

The staff spends much of their time working with private landowners and local governmental agencies in the preparation of management plans required by the permit system. Marine organisms are monitored and when practical are permitted to enter the management units at Rockefeller.

During the past fiscal year, several Fur & Refuge Division biologists worked very diligently with members of the Governor's Task Force preparing a coastal marsh action plan. In conjunction with this plan the technical staff of this Division cooperated with personnel from other divisions and submitted a Marsh Management Policy for the Department. This policy will go into effect pending approval of the Secretary. Personnel from Rockefeller Refuge prepared and submitted operational criteria to accompany the plan which will be used to guide and assist in marsh management plans for the future. Once implemented, the plan will greatly enhance the ability of the Department and especially the coastal landowners in their efforts to prevent further deterioration of the coastal marshes and will aid them in establishing constructive, well planned marsh management projects.

During fiscal year 1987-88, the Fur and Refuge Division aided the Fish Division in their striped bass program. Three day old fry were received from the Toledo Bend Hatchery, April 20, 1988 and stocked into nursery tanks at Rockefeller. After a short nursery period, they were transferred to ponds and cultured to fingerlings before stocking into the river systems of southwest Louisiana. A total of 76,988 were stocked into the Calcasieu River above Lake Charles, 107,283 were stocked in the Mermentau River and 4,000 were stocked on Rockefeller Refuge. The program has been successful in that several fish in the 20 pound class have been caught in the Calcasieu system and a 10.5 pound fish was recently caught on Rockefeller Refuge.

The channel and blue catfish tagging program continued during this fiscal year though sampling effort was not as extensive. Channel catfish recapture data demonstrate considerable seasonal movement of this fish in southwest Louisiana. Thus far, in excess of 12,000 fish have been tagged by the Fur and Refuge Division in hopes of learning more of its natural life history and to consider this in marsh management programs of the Department.

Two additional species, the redfish and Pacific white shrimp, were incorporated into the aquaculture studies by the Division. Redfish fry were obtained from a private producer and grown in a cooperative project to fingerling size. They were then restocked in the fall of 1987 and attempts were made to culture them through the winter in ponds stocked at different densities. None survived the winter. It still is not certain if the effects of low wintertime temperatures in low salinity ponds were the limiting factor. Cooperative studies through a contract with LSU should provide information on the effects of temperature on redfish fry and fingerlings.

The Pacific white shrimp was tested in Central and South America with good results. In the United States they are grown in ponds in Hawaii, South Carolina, Texas and Mississippi. We were able to obtain fry from a commercial hatchery in Panama City, Florida in June, 1988. Research ponds (0.1 ac. each) at Rockefeller Refuge were stocked with fry at two densities, 25,000/ac. and 100,000/ac. Results thus far are promising as the ponds were harvested in October, 1988 and production was good.

A fisheries investigation by USL under contract with Louisiana Department of wildlife and Fisheries's Fur and Refuge Division began in 1987 at State Wildlife Refuge. Using gill nets, trawls and a quantitative sampler, Dr. Hosey of USL is developing an overview of fisheries organisms on the Refuge and attempting to document weir induced effects on these organisms.

The recreational use survey of Rockefeller Refuge continued during this fiscal year. Over 20,000 automobiles were counted utilizing the limited road system of Rockefeller. Also, an estimated 70,000 people visited the refuge for sight seeing, fishing, boating or other recreation.

Some of the most notable research projects conducted by the Fur and Refuge Division have been basic life history studies of the American alligator. Most recently, studies investigating temperature-sex dependence, stress factors, and reproductive biology have added greatly to the general knowledge of the alligator and have benefitted alligator/crocodile conservation programs throughout the world. Active alligator research projects during 1988 involved pen culture studies, egg incubation investigations; controlled environmental chamber culture; specialized laboratory study of blood, bone, and tissue samples; age determination of a group of femur samples; alligator nutrition studies; and the characterization of ecological and environmental factors affecting alligators. The Chinese alligator propagation project was continued during 1988 with one nest being produced. Young produced from this nest will be sent to the New York Zoo. Encouraging results were achieved, after years of study, in the development of a dry alligator ration for use in the alligator farming industry. This project, a cooperative effort with Louisiana Department of Wildlife and Fisheries, LSU Medical School personnel and the University of Georgia, demonstrated that alligators fed on a commercial-type ration can grow as well as those fed on nutria.

Louisiana's reintroduced Brown Pelican colonies produced approximately 1,500 fledglings in 1988. Severe erosion on all three nesting colonies in Louisiana continues to threaten the future of the Brown Pelican in Louisiana. Queen Bess Island has undergone extensive damage due to erosion, subsidence, and severe weather which has eliminated the black mangrove on the island. Major rebuilding of the island is desperately needed by federal, state or private interests. The Department reintroduced colony at Last Island produced a substantial number of fledglings in 1988. The project of establishing the nesting colony at Last Island was initiated by Fur and Refuge Division in 1983. The results of this project exemplify that research and implementation of procedures learned in the research can produce practical results.

Louisiana's southern bald eagle population soared in 1988 and reach new heights with 41 fledglings produced. The monitoring of the eagle habitat and nesting success parallel Fur and Refuge Division efforts toward marsh enhancement and productivity. The monitoring program was initiated in 1984 with 18 active nests. In comparison to 1987, the 1988 survey found five additional nests bringing the total to 35 active nests. Further monitoring of this population is needed by the Department in order to document increases of the southern bald eagle in Louisiana.

In 1988 approximately 400 Canada goslings were produced at Rockefeller Refuge. These birds were released locally at the headquarters site in order to increase the resident population of geese in this area.

An evaluation of marsh management techniques on Rockefeller Refuge was continued in 1988. Vegetative transect data consisting of percent plant composition by species and cover were collected along with water level and salinity data by management unit. A new study was begun to test the feasibility of using computer generated maps (based upon transect data as ground truth and aerial photography) to upgrade management practices on the Refuge. These data can then be compared to alligator nest densities, waterfowl use, waterfowl time activity budgets, and other animal-use parameters in order to characterize the productivity of the various management units on Rockefeller Refuge.

During 1988, studies were conducted relative to general waterfowl research projects. These studies investigated: evaluation and monitoring of the Canada goose flock; evaluation of marsh management practices in relation to waterfowl usage within managed semi-impoundments and controls; determination of mottled duck movement and mortality in coastal La. (banding program); molting chronology of mottled ducks in coastal La.; aerial waterfowl inventory on Rockefeller Refuge; waterfowl habitat suitability index evaluation; habitat preference of molting mottled ducks in coastal La.; occurrence of lead and steel shot pellets in duck gizzards collected in southwest La.; the use of managed semi-impoundments by wildlife in coastal wetlands at Rockefeller Refuge; grit site usage by wildlife in southwest Louisiana and southeast Texas; and the annual cycle of body composition of mottled ducks with special reference to feeding ecology and control of reproduction. Field work was continued on a project to investigate the temporal variability in the structure of wading-bird communities.

A cooperative project was initiated on a Mineral Management Service Study with DNR, LSU and USL. The ultimate goal is to develop a suitability and feasibility index of marsh management practices for use by state and federal wetland regulatory and advisory agencies. Through DNR, the Mineral Management Service is utilizing expertise of LSU, USL, and the Fur and Refuge Division in a field evaluation of the effectiveness of implemented marsh management plans to the development of the index. Rockefeller Refuge was chosen as the southwest Louisiana study area. This study will evaluate vegetative productivity, marsh accretion, subsidence, fisheries abundance and chronology and compare the productivity of managed and unmanaged units on Rockefeller Refuge.

The five technical personnel at Rockefeller Refuge were responsible for the publication of 12 technical and semi-technical papers during 1988. These publications are disseminated worldwide through the technical journals and also through literature requests made by the scientific communities throughout the world. During 1988, an international herpetological meeting was held in Lae, Papua New Guinea. At this meeting, a member of the technical staff of Rockefeller Refuge presented three papers dealing with their findings concerning the alligator research program.

Fur Research and Management

During 1988 data collection and analysis continued on projects involving nutria, raccoon, river otter, fox and coyote interactions, alligators, fur harvest distribution, scent post study, and trap evaluation. Operation of the Louisiana Fur and Alligator Advisory Council has been a high priority during 1988. Considerable time and effort has been spent on fur market analysis (emphasis on nutria) and development of programs and strategies to combat national and international anti-trapping campaigns. The goals of the Council are absolutely essential in order for the Division to carry out meaningful furbearer management programs.

Due to the importance of the nutria to Louisiana's fur industry, (generally accounting for approximately 54% of the total value) emphasis is placed on research, management and marketing of this species. Field research and evaluation of a project entitled "An Experimental Reintroduction of Nutria and Subsequent Assessment of Changes in Population Parameters" continued during 1988. The main objective of this project is to determine if it is feasible to introduce nutria into marsh areas where nutria populations have declined and are nonexistent or at extremely low densities but the habitat is suitable to support high populations of nutria. Evaluation of releases made in 1986 are ongoing and a total of 278 nutria (58% females) were captured and released into 3 study areas in 1987. During 1988 approximately 600 nutria were live captured on Marsh Island and released into 7 study areas in Vermillion Parish. Preliminary evaluation indicates increasing nutria populations on these release sites. During 1989, nutria from the release sites will be evaluated to assess various changes which may have occurred due to these introductions. If the reintroduction prove to be successful, land managers may attempt to introduce nutria into marsh areas that have vegetatively recovered from overutilization of nutria in past years.

A raccoon research project entitled "Raccoon Population Densities, Harvest Mortality and Hardwood Communities" continued in 1988. Raccoons are currently the second most important furbearer in Louisiana with a harvest in 1986-87 of 240,396 animals valued at $2.4 million. Specific objectives include:

1) Estimate population densities of raccoon in delta bottomland hardwoods.
2) Estimate percent of population harvested by trapping and hunting.
3) Estimate relative efficiency of each harvest technique.
4) Estimate natural mortality.
5) Determine impact of harvest on raccoon populations.

Live trapping for population estimates began in May, 1987 and a total of 180 raccoons were trapped and released. Total raccoon captures and recaptures was 271. Recaptures of tagged raccoons by hunters and trappers are currently being evaluated. During the spring of 1988 a total of 75 raccoons were marked and released. Telemetry collars were placed on 12 raccoons to record habitat usage relative to water level changes and drought on Ouachita WMA. Due to severe reductions in raccoon pelt value, the objectives of determining harvest rates and proportion of raccoons taken by hunting versus trapping will have to be determined in subsequent years.

In cooperation with the LSU School of Forestry and Wildlife Management, three research projects were active during 1988. Field work was initiated during the spring of 1987 on a project concerning food preference of nutria in Cypress-Tupelo swamp habitat in southeastern Louisiana. Nutria droppings were collected quarterly from two study areas and specific plants identified microscopically by cell structure. Understory species composition was determined in order to assess preferences or selection of specific plants by nutria. Overstory composition and crown closures are also being assessed to determine the effect of these variables on understory vegetation. Summer and winter nutritional content of the plants being consumed will be assessed. Also, nutritional content of the most commonly utilized plants in the swamp will be compared to the plants most commonly utilized in fresh and brackish marsh. Field work was completed in 1988 and a thesis will be completed in 1989.

A second project involves habitat assessment on Marsh Island Wildlife Refuge relative to weired versus unweired brackish marsh. Habitat assessment includes emergent and aquatic vegetation, historic and present day land to water ratios and erosion rates on Marsh Island. Field vegetation analysis was conducted during the summer of 1987 and a series of aerial photographs have been obtained to assess land/water ratios and erosion rates. Data analysis from aerial photography work was completed during 1988 and a thesis will be available in 1989.

A third project involves a telemetry study on fox and coyotes in central Louisiana. The basic objectives were to determine home range for both fox and coyotes and to assess the interaction and effect of increasing coyote populations on fox populations. Field work was completed in 1988 and the data analysis and report writing will be completed in 1989.

A trap evaluation project was initiated on Marsh Island in December, 1987. Three traps (#11 Longspring, #2 Longspring, and the fox Soft-Catch) were evaluated for foot injury and catch efficiency for harvesting nutria. A total of 391 nutria were captured. The #11 and #2 Longspring traps are the two most commonly used traps for nutria in coastal Louisiana. The fox Soft-Catch trap is of comparable size and may provide an alternative to the standard traps currently being used. The chain on the fox Soft-Catch was changed to match the chains used on the #11 and #2 Longspring traps. Preliminary data indicated that the fox Soft-Catch trap reduces foot injury, is capable of holding nutria and is slightly less efficient than the other traps being evaluated. The project was continued during the 1988-89 trapping season. The #2 Longspring was tested against the fox Soft-Catch to determine efficiency in capturing nutria. A total of 403 nutria were captured. Due to a higher number of snaps occurring with the fox Soft-Catch, capture rate was approximately 20% higher with the #2 Longspring. Modifications to the fox Soft-Catch will be made to eliminate the higher incidence of snaps.

A third experimental harvest of alligators was conducted on Marsh Island Wildlife Refuge in 1988. Since 1988, a total of 4,358 were harvested from Marsh Island. The alligators were sold whole and processed for meat and hides. Data analysis continues on sex ratios, size class frequency distribution and production rates. Other alligator research presently being conducted on Marsh Island includes nest counts, night counts and tagging and release of alligators for growth estimates.

Scientific papers that were submitted for publication during 1988 include:

1) Management Implications of an Adult Female Alligator Reproductive Study.

2) Mortality Estimates of Muskrat Litters in a Louisiana Coastal Marsh.

3) Muskrat Reproduction and the Effect of Tidal Flooding in Louisiana.

Various projects are conducted annually to monitor furbearer population trends, total harvest and harvest rates. A scent post survey consisting of approximately 1,500 stations is conducted annually in October to index bobcat, fox, coyote and raccoon populations. Mandatory fur buyer-dealer reports are submitted annually to provide information on total fur harvest by species and fur harvest distribution.

Fur and Refuge Division initiated the monitoring of the marsh area to be impacted by the Caernarvon Freshwater Diversion Project for muskrats and alligators during 1988. A total of 12 transect lines were flown on 19 April, 1988, to index muskrat populations by counting muskrat lodges and a total of 8 transect lines were flown on 6 and 7 July, 1988, to monitor alligator populations by counting alligator nests. Vegetative transects that were to be completed during the late summer of 1988 were not flown because the helicopter contract was cancelled and a new one was never negotiated. All transect lines for the muskrat house and alligator nest surveys were flown with a Bell Jet Ranger 206 helicopter. Data from these surveys have been summarized and furnished to Seafood Division.

During the late summer of 1987 the Division initiated activities to develop an updated vegetative type map of coastal Louisiana. Transects were flown across coastal Louisiana at an average spacing of approximately 1.8 miles. The transects ran from the northern boundary of the coastal marshes to the Gulf of Mexico. The survey required approximately 80 hours of helicopter time. Dr. Robert H. Chabreck cooperated with the Division in the collection of data from these aerial surveys. Vegetative types were marked on aerial photographs during the two weeks of flying. The transfer of data from aerial photographs to a base map was delayed for quite some time in an attempt to find an accurate base map, that is, one showing a true picture of land to water. By working with the Department of Natural Resources, the Division was able to have base maps generated utilizing computer data, digitized from the 1978 aerial photographs of the coast. These maps were produced during the summer and fall of 1988. The slow job of transferring information from aerial photographs to the base maps was initiated late in 1988. Once this process is completed and the base maps have received the final work by a cartographer then the maps will hopefully be printed.

The Fur Research and Management Section spent a considerable amount of time preparing a report for Jean Lafitte National Historical Park under Cooperative Agreement No. CA70297002. A Memorandum of Understanding between the Department of wildlife and Fisheries and the Jean Lafitte National Historical Park was signed in August, 1987. This MOA stated that the Jean Lafitte National Historical Park and the Louisiana Department of Wildlife and Fisheries are mutually interested in and desire to cooperate in the planning and conducting of programs pertaining to the protection, conservation and replenishment of the wildlife and fisheries resources of Louisiana and such programs, regardless of who conducts or finances them, will be valuable and necessary to the Park, and it is advantageous to both parties to enter into an agreement in order to facilitate and coordinate the program.

The statement of work under Article II in this document reads as follows:

Based on the mutual interest in the protection, conservation and replenishment of wildlife and fisheries resources, the Park and the Department agree to jointly enter into a cooperative research program designed to:

1) Formulate harvest recommendations for the taking of deer; develop a relatively simple census program for monitoring future trends in deer abundance.
2) Provide population assessments for nongame furbearing quadrupeds (e.g. nutria, otter, mink, muskrats, raccoon, etc.) which are trapping target species.
3) Provide critical review of Park trapping plan.
4) Provide population assessments for the alligator; develop a relatively simple census program for monitoring future trends in alligator abundance.
5) Census the small mammal species populations (nongame, non-trapping target species) and provide estimates of their relative abundance.

Tasks 1 through 4 were covered in the report submitted by the Department.

Additionally, personnel from the Fur Research and Management Section assisted in the following Division programs and projects:

1) Administration of the annual statewide alligator harvest program for Iberia, St. Mary, St. Martin, Assumption, Terrebonne and Lafourche Parishes. This area accounts for approximately 41% of the total tags issued each year.
2) Assisted Rockefeller Refuge personnel in conducting the annual coastwide alligator nest count survey.
3) Verification of alligator hides prior to shipment out of state.
4) Assisted Rockefeller Refuge personnel in conducting an alligator skin grading project in which over 5,000 skins from throughout the state were examined.
5) Assisted Minden personnel in conducting the alligator research on Salvador WMA. This research consisted of an extensive tagging program, night counts, nest counts, and harvest season.
6) Assisted Minden personnel in analysis and report writing on an alligator reproductive study entitled "Management Implications of an Adult Female Alligator Reproductive Study".
7) Assisted Salvador WMA personnel on check stations for the annual managed deer hunts.

Fur Section personnel represented the Department in Washington, D.C. at a meeting arranged by the International Association of Fish and Wildlife Agencies and the Fur Institute of Canada. The purpose of the meeting was to develop a close working relationship between key members of Congress like Senator John Breaux and his counterpart in the Canadian Parliament. The purpose of this arrangement is to improve coordinating responses from North America to anti-fur activity in other parts of the world. This arrangement was most helpful in defeating an attempted anti-fur labeling campaign in England.

Division staff continued to represent the Department at two meetings concerning the international effort to standardize trapping systems for furbearers. Staff members also presented a summary of Louisiana's research concerning furbearers and the evaluation of the soft catch trap at the annual Southeastern Workshop which was held in Georgia. Louisiana worked for the creation of this Southeast Technical Working Croup and continues to provide strong leadership for the furbearer biologists in the Southeast.

Division personnel have been actively involved with the Fur Resources Committee of the International Association of Fish and Wildlife Agencies since its creation in 1976. Staff personnel have served as chairman for two years and vice-chairman for 9 years. Louisiana provided the coordination and completion of the most significant study yet concerning injury reduction and efficiency evaluation utilizing the soft catch trapping systems. This research was conducted under the auspices of the International Association of Fish and Wildlife Agencies. The Division continued to provide compilation of harvest data for the United States as requested by the IAFWA. Louisiana has served as a clearing house for this information for the past 7 years. This information was published in a fur harvest document by the Ontario Ministry of Natural Resources as well as in a 10 year wildlife status summary completed by the U.S. Forest Service.

Resource Management

The Fur and Refuge Division has the responsibility of managing the fur and alligator resources of the state. The division's overall goal is to maintain or improve the resource while allowing optimum utilization.

Fur and Refuge Division personnel continued the monitoring program on the statewide harvest of alligators. During the 1988 season, approximately 24,000 tags were issued to

1,535 commercial hunters statewide. These hunters took 23,526 alligators with an estimated value of $7,905,000. Skins were sold primarily to foreign markets in France, Japan, and Italy.

Along with the sale of skins, alligator meat is processed and channeled into the restaurant trade as well as for home consumption. Over 600,000 pounds of alligator meat (deboned) were sold for human consumption during the September, 1988 season. Louisiana alligator farms produced approximately 12,500 alligator skins (valued at 1.75 million dollars) and approximately 63,000 pounds of deboned meat. Value of the meat at the retail level from wild harvest and farm raised amounted to about 2.4 million dollars.

Suitable farming stock has severely limited the advancement of alligator farming operations in the United States. The Louisiana Department of Wildlife and Fisheries realized this situation and has provided stock from state-owned lands since 1977. Farmers that qualify for the program are given hatchling alligators annually until such time as their breeding stock is capable of producing the number of young desired to become a self-sustaining farm. Today, Louisiana has established 54 alligator farms statewide with about 84,000 alligators being housed on these farms. During the 1988 nesting season, approximately 9,200 eggs were hatched in Rockefeller Refuge incubators and these young animals were distributed to the 15 registered farms serviced through the state supplement program. During 1988, 34 alligator ranchers hatched 54,184 alligators from 69,241 eggs collected on private properties. Additionally 1,253 hatchlings were collected under the permit program.

A total of 1,009,428 pelts were harvested during the 1987-88 trapping season yielding a net value of approximately $3.8 million. These figures represent a 428,966 decrease in the number of pelts harvested and a $3 .3 million decrease in value from the previous year. The vast majority of this change resulted from a decrease in the number and value of the nutria and raccoon harvest.

Fur and Alligator Advisory Council

The Fur and Alligator Advisory Council completed its first fiscal year of operation in June of 1988. The Council and special fund are the result of Act 455 of the 1986 regular legislative session. This legislation raised the cost of a trapping license (for trappers 15 and older) from $2.00 to $25.00 and dedicated $20.00 of this $25.00 to a special fund. Twenty dollars out of each alligator hunting license was also dedicated to this fund. The special fund called the Fur and Alligator Public Education and Marketing Fund was designed to support very specific programs to insure a stable future for the state's fur and alligator industry. The legislature also created a nine man council to provide advice to the Secretary of the Department and a review of all of the expenditures made by the Department with these dedicated funds.

The two major goals of the Council are:

1) Education of the public concerning the role of trapping in wildlife conservation.

2) Market stabilization and enhancement for Louisiana's fur and alligator products.

During fiscal year 1987-88 the Council spent a total of $116,661. A total of $81,500 was spent on Memorandums of Agreement. These included the following: Crocodilian Trade Study, Public Opinion Survey, Alligator Grading Study, Fur Advertising Campaign (trade publication), Fur Advertising Campaign (posters) , Fur Labeling Campaign, Fur Market Study, 4-H Fur Book Revision. The Council also purchased 2 portable displays and VCR monitor players. Other expenditures included furs, booth rental at the Montreal International Fur Fair, a grant to complete major textbook on furbearer management in North America and approximately $3,500 for travel .

This first year of operation provided a good foundation for the important goals of this group. The Council and its special fund exist because of very serious problems facing Louisiana's fur and alligator industry and a commitment on the part of the trappers, alligator hunters and major coastal landowners. If these problems concerning public education and market enhancement were short term or minor, the Council would probably not exist. The problems grew over a period of years and as such will take a period of years to correct. However they are correctable and to believe otherwise is to write off an industry that has produced the largest fur and alligator harvest in the United States. For specific details of Council activities see the 1987-88 Annual Report — Fur and Alligator Advisory Council.

WILDLIFE & FISHERIES
DEPARTMENT
LOUISIANA